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إدارة المشروعات الهندسية

## **Factors affecting women career choice: comparison between civil engineering and other engineering disciplines**

العوامل التي تؤثر على اختيار المرأة لمهنتها: مقارنة بين الهندسة المدنية وغيرها من التخصصات الهندسية

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"وَلَسَوْفَ يُعْطِيكَ رَبُّكَ فَتَرْضَىٰ"

الضحى - آية ٥

## *Dedication*

*To my parents, my brothers and my sisters for their  
unlimited support*

*Amany*

## Acknowledgement

- ♥ I wish to express my profound gratitude to Prof. Adnan Enshassi for his continued guidance, supervision, and comments throughout the course of this research. He has been ever-present force in helping me to mature as a student and as a researcher. His dedication to helping me succeed is deeply appreciated.
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## *Abstract*

It is important to engineering profession to know why engineering women prefer some engineering profession than other and what factors are effects on them to choose this profession. Engineering has always been a male dominated profession and has not been successful in attracting women as other previously male-dominated fields. Despite the involvement of women in engineering field is growing, women are observed as minority in this field. The aim of this research is to identify the factors that influencing the choice of career in different engineering disciplines by women in Gaza Strip.

This research has been conducted through literature reviews of the topic related to the factors affecting on women career choice in engineer, followed be a filed questionnaire survey used for collecting data. The target samples of research are employment engineering women, unemployment engineering women, female engineering students, and engineering companies. The questionnaire included eighty seven factors, categorized into ten groups after using factor analysis and relative important index "RII", two hundred and seventy were distributed. Two hundred and twenty five questionnaires were received.

The main factors affecting women career choice are: the ability of women to work in the field of engineering, male dominance on the engineering profession, the personal qualities of an engineer engineering women, social value and prestige related with engineer, work environment and working hours, family and parents, discrimination against women, historical role of women, and culture.

Also from the result of this research are most respondent think that their choice career in engineering is right decision, most respondent choice their career based on the desire to advance, most respondent agreed that university degree in engineering qualifies (technically - psychologically - socially) to enter the field of work, less than half of respondent will encourage junior engineers to enter in the field of engineering, small number of respondent agreed that small number of women employees in some engineering disciplines due to the inefficiency and lack of skill. More than half think that jobs in the field of engineering are less popular for women to specialize in other sectors, very small number of respondent will study another sector as mathematics or physics if they don't have an opportunity to work as engineer. Very small number of respondent are have knowledge about engineering before choice their career.

Research found that high rate in high school, exploration of the unknown, high social value of engineer are the most attitude affected on women career choice in engineering but male dominance of engineering profession, difficult study of engineering college and high cost of engineering study are the least attitude of women in career choice in engineering. The discriminatory environment of engineering profession, male dominance of engineering profession are represent barriers facing women entering and working within different engineering discipline. Architect and computer engineer is the most popular engineering discipline for women; also this study found that there is relationship between culture and choices of profession and career success.

The study recommended highlighting on the successful women model in engineering to stand on how they overcame some of the challenges in work environment. Improved the working and employment conditions for women is needed. Current legislation must be enforced combined with an engineer association specifying and prescribing modern and safe working conditions. An engineer association must encourage women engineering and join them and network with other professional women or women in leadership positions. Government must support engineering women by helping with funding and provide jobs. Also recommended to, enhance the personal qualities of engineering women to compete in the labor market. Eliminate the discrimination against women in engineering working site. Increase the quota of employment the women to eliminate the male dominance on the engineering profession.

## ملخص البحث

من الأهمية بمكان لمهنة الهندسة معرفة التخصصات التي تفضلها المرأة، و كذلك الوقوف على اهم العوامل التي تؤثر على المرأة عند اختيار مهنة الهندسة، و يعتبر تخصص الهندسة من التخصصات التي يسيطر عليها الرجال، و لم تنجح الهندسة بأستقطاب المرأة اليها مثل التخصصات الأخرى التي كانت حكرًا على الرجال، على الرغم من إدعاء غير ذلك، فمن الملاحظ أن المرأة تتواجد بعدد قليل في بعض تخصصات الهندسة. و تهدف الدراسة إلي تحديد العوامل التي تؤثر على المرأة عند اختيار مهنتها في الهندسة.

أعتمد البحث على مراجعة الدراسات السابقة في المواضيع ذات العلاقة بالعوامل التي تؤثر على المرأة في اختيار تخصصها، تبع ذلك بحث ميداني لجمع البيانات. الفئة المستهدفة في البحث هي المهندسات العاملات، المهندسات غير العاملات، طالبات كلية الهندسة، الشركات العاملات في مجال الهندسة. أشتمل الاستبيان على سبعة و ثمانون عامل تم تصنيفهم إلي عشرة مجموعات بعد استخدام التحليل العائلي و مؤشر الأهمية النسبي. تم توزيع مائتي و سبعون إستبيان على العينة. و تم أستلام مائتي و خمسة و عشرين إستبيان.

لقد أوضحت النتائج لسبع و ثمانين عامل التي صنفت بأستخدام التحليل العائلي و مؤشر الأهمية النسبي إلي عشرة مجموعات من العوامل التي تؤثر على اختيار المرأة لمهنتها و هي كالتالي : مقدرة المرأة على العمل في مجال الهندسة، سيطرة الرجال على تخصص الهندسة، الصفات الشخصية للمرأة، البرسيتيج و مكانه الاجتماعية للهندسة، بيئة العمل و ساعات الدوام، الأسرة و الأبناء، التمييز ضد المرأة، الدور التاريخي للمرأة، و الثقافة السائدة في المجتمع.

و من النتائج أيضا الحصول على المعدل المرتفع في الثانوية العامة، الرغبة في استكشاف المجهول، و القيمة الاجتماعية لمهنة الهندسة من أكثر ما يؤثر في موقف المرأة من اختيار الهندسة كمهنة لها. و يعتبر كلا من سيطرة الرجال على مهنة الهندسة، و صعوبة و أرتفاع تكلفة الدراسة في الهندسة من أقل العوامل التي تؤثر على موقف المرأة في اختيار مهنة الهندسة. و من العقبات التي تواجه المرأة و تدفعها لاختيار تخصص أخر غير الهندسة البيئة التمييزية للهندسة، و سيطرة الرجال على تخصص الهندسة.

و من النتائج الخاصة بالبحث أيضا، معظم العينة من المهندسات يعتقدن أن اختيار مهنة الهندسة كان صائبا و يشعرن بالرضا في عملهم الهندسي، معظم العينة اختارت تخصص الهندسة بناء على رغبة مسبقة، و تري معظم العينة أن شهادة الجامعة كافية لدخول المرأة المنافسة في سوق العمل، و كذلك توافق معظم العينة على أن قلة عدد النساء العاملات لا يعود لقلة المهارة. أكثر من نصف العينة تري أن عمل المرأة في مجال الهندسة أقل شعبية لدى

النساء من التخصصات الأخرى، عدد قليل جدا يرغب في دراسة تخصص آخر غير الهندسة في حال عدم الحصول على عمل، و عدد قليل من العينة لديها معرفة مسبقة بالهندسة قبل اختيار التخصص. و يعتبر تخصص الهندسة المعمارية من أكثر التخصصات الشعبية لدى المرأة، يتبع بتخصص هندسة الحاسوب كثاني أكثر التخصصات الشعبية عند المرأة، و وجدت الدراسة كذلك أن هناك علاقة كبيرة بين الثقافة السائدة عند المرأة و نجاح المرأة في العمل الهندسي.

و قد أوصت الدراسة بتركيز الضوء على النماذج الناجحة في العمل الهندسي للوقوف على العقبات التي واجهتها و كيف تغلبنا عليها، تحسين شروط التوظيف الخاصة بالمرأة، تعديل القوانين الخاصة بالمرأة التي تحدد نشاطها و تضع شروط السلامة في العمل و توفير البيئة المناسبة لعمل المرأة. على النقابة أن تلعب دورا فعالا في التواصل مع المهندسات و تعريفهم على المهندسات الناجحات، على الحكومات ان تعمل على تشجيع المهندسات بتوفير فرص عمل لهن، تحسين قدرات المهندسة عن طريق التدريب حتي تكون قادرة على المنافسة في سوق العمل، القضاء على البيئة التمييزية ضد المرأة ومحاولة تغيير ثقافة المجتمع في عمل المرأة، زيادة حصة النساء في الوظيفة.



## Table of Contents

Dedication	II
Acknowledgement	III
Abstract	IV
ملخص البحث	V
Table of Contents	VI
List of tables	IX
List of figures	XIV
<b>Chapter 1: Introduction</b>	1
1.1 Problem statement	2
1.2 Research scope and objectives	2
1.3 Hypotheses	3
1.4 Research justification	3
1.5 Limitations of the Study	4
1.6 Methodology	4
1.7 Chapter Divisions	4
<b>Chapter 2: Literature review</b>	6
2.1 Introduction	6
2.2 Career decision-making in engineering	6
2.3 Women and professionalization in engineering	7
2.4 Female engineers and engineering jobs	8
2.5 Underrepresented women in different engineering disciplines	8
2.6 Factors affecting on women in choose her career	9
2.6.1 Parents and family	9
2.6.2 Masculinity and feminization of engineering	11
2.6.3 Culture	12
2.6.4 Sex discrimination and harassment on site	12
2.6.5 Working environment	13
2.6.7 Working hours	14
2.6.8 Financial discrimination	15
2.6.9 Family responsibility	15
2.6.10 Intellectual and physical capability	16
2.6.11 Job opportunities and societal need	16
2.6.12 Career Knowledge	17
2.6.13 Prestige of a career	17
2.6.14 Employers' attitudes and employment conditions	18

2.7 Engineering women in developed country	18
2.8 Engineering women in developing country	21
2.9 Women in Palestinian	23
2.9.1 Distribution of Women over Different Engineering Fields in Gaza Strip	24
2.10 Conclusion	25
<b>Chapter 3: Research methodology</b>	29
3.1 Introduction	29
3.2 Research Design	29
3.3 Research Purpose	30
3.4 Data Collection	31
3.5 Research population and sample size	31
3.5.1 Questioner distribution	33
3.5.2 Sample characteristic	33
3.6 Questionnaire design	34
3.7 Pilot Study	44
3.8 Validity of the Research	44
3.8.1 Content Validity of the Questionnaire	44
3.8.2 Statistical Validity of the Questionnaire	45
3.8.3 Criterion Related Validity	45
3.8.4 Structure Validity of the Questionnaire	45
3.9 Reliability of the Research	45
3.9.1 Split-Half Coefficient method	46
3.9.2 Cronbach's Coefficient Alpha	47
3.10 Data processing and analysis	48
3.10.1 ANOVA test	48
3.11 Statistical analysis	49
3.11.1 One-Sample Kolmogorov-Smirnov Test	49
3.11.2 Factor analysis	49
<b>Chapter 4: Results and discussion</b>	53
4.1. Introduction	53
4.2 Part one: Profile of sample	55
4.3 Part two: Comparison between engineering disciplines related to factors affecting on	57
4.3.1 First group: the ability of women to work in the field of engineering	57
4.3.1.1 Discipline: Civil women engineer	57
4.3.1.2 Discipline: Architect women engineer	59
4.3.1.3 Discipline: Communication women engineer	61
4.3.1.4 Discipline: Computer women engineer	62

4.3.1.5 Discipline: Industry women engineer	63
4.3.1.6 Comparison for each discipline	65
4.3.1.7 First hypotheses tested in this research are	67
4.3.2 Second group: Male dominance on the engineering profession	69
4.3.2.1 Discipline: Civil women engineer	69
4.3.2.2 Discipline: Architect engineer	71
4.3.2.3 Discipline: Communication engineer	72
4.3.2.4 Discipline: Computer engineer	73
4.3.2.5 Discipline: Industry engineer	74
4.3.2.6 Comparison for each discipline	76
4.3.2.7 Second hypotheses tested in this research are	78
4.3.3 Third Group: The personal qualities of an engineer engineering women	80
4.3.3.1 Discipline: Civil women engineer	80
4.3.3.2 Discipline: Architect women engineer	81
4.3.3.3 Discipline: Communication women engineer	82
4.3.3.4 Discipline: Computer women engineer	83
4.3.3.5 Discipline: Industry women engineer	84
4.3.3.6 Comparison for each discipline	85
4.3.4 Fourth Group: Social value and prestige related with engineer	88
4.3.4.1 Discipline: Civil women engineer	88
4.3.4.2 Discipline: Architect women engineer	89
4.3.4.3 Discipline: Communication women engineer	90
4.3.4.4 Discipline: Computer women engineer	91
4.3.4.5 Discipline: Industry women engineer	92
4.3.4.6 Comparison for each discipline	93
4.3.5 Fifth Group: Work environment and working hours	95
4.3.5.1 Discipline: Civil women engineer	95
4.3.5.2 Discipline: Architect women engineer	96
4.3.5.3 Discipline: Communication women engineer	97
4.3.5.4 Discipline: Computer women engineer	98
4.3.5.5 Discipline: Industry women engineer	99
4.3.5.6 Comparison for each discipline	100
4.3.5.7 Third hypotheses tested in this research are	101
4.3.6 Group number six: Family and parents	103
4.3.6.1 Discipline: Civil women engineer	103
4.3.6.2 Discipline: Architect women engineer	104
4.3.6.3 Discipline: Communication women engineer	105

4.3.6.4 Discipline: Computer women engineer	105
4.3.6.5 Discipline: Industry women engineer	107
4.3.6.6 Comparison for each discipline	108
4.3.6.7 Fourth hypotheses tested in this research are	110
4.3.7 Group number seven: Discrimination against Women	112
4.3.7.1 Discipline: Civil women engineer	112
4.3.7.2 Discipline: Architect women engineer	112
4.3.7.3 Discipline: Communication women engineer	114
4.3.7.4 Discipline: Computer women engineer	115
4.3.7.5 Discipline: Industry women engineer	116
4.3.5.6 Comparison for each discipline	118
4.3.5.7 Hypotheses number five tested in this research are	121
4.3.8 Group number eight: Historical role of women	122
4.3.8.1 Discipline: Civil women engineer	122
4.3.8.2 Discipline: Architect women engineer	123
4.3.8.3 Discipline: Communication women engineer	124
4.3.8.4 Discipline: Computer women engineer	125
4.3.8.5 Discipline: Industry women engineer	126
4.3.8.6 Comparison for each discipline	128
4.3.9 Group number nine: Culture	129
4.3.9.1 Discipline: Civil women engineer	129
4.3.9.2 Discipline: Architect women engineer	130
4.3.9.3 Discipline: Communication women engineer	130
4.3.9.4 Discipline: Computer women engineer	131
4.3.9.5 Discipline: Industry women engineer	132
4.3.9.6 Comparison for each discipline	133
4.3.9.7 Hypotheses number six tested in this research are	134
4.3.10 Group number ten	136
4.3.10.1 Discipline: Civil women engineer	136
4.3.10.2 Discipline: Architect women engineer	137
4.3.10.3 Discipline: Communication women engineer	137
4.3.10.4 Discipline: Computer women engineer	138
4.3.10.5 Discipline: Industry women engineer	139
4.3.10.6 Comparison for each discipline	140
4.3.11 Ranking of factor group are affecting women career choice of engineering	141
4.4 Part three: Attitude of engineering women concerning developing their future career.	143
4.4.1 Attitude of engineering women concerning developing their future career	143

4.4.2 Barriers to women entering and working within different engineering discipline	146
4.4.3 Popularity of engineering disciplines	147
4.4.4 The relationship between culture background and the effect of perceived image of	147
4.4.5 Opinion of women engineer with engineering discipline	148
4.5 Part four: Company attitude with engineering women	151
4.6 Part five: Factor analysis	154
4.6.1 Factor Interpretation	154
4.6.2 Comparison between the result from factor analysis and relative important index	157
<b>Chapter 5: Conclusions and recommendations</b>	162
5.1 Introduction	162
5.2 Conclusion	163
5.3 Recommendation	167
5.4 Further recommended studies	167
References	169
Appendix 1: The questionnaire (Arabic Version).	177
Appendix 2: The questionnaire (English Version).	186
Appendix 3: Questionnaire validity	195

## List of tables

### Chapter 2

Table (2.1): Female Students in Different Engineering Fields in the Netherlands	20
Table (2.2): Enrolment of female/male in the engineering program in Lebanon	21
Table (2.3): Participation Rate by sex in Different Fields	23
Table (2.4): Number of Female and male engineers in Different Engineering Fields in Gaza	24
Table (2.5): The factors affect women choice her career according to their references	26

### Chapter 3

Table (3.1): Sample characteristic	33
Table (3.2) likart scale	34
Table (3.3) List of factors affecting women career choice	39
Table (3.4) Structure Validity of the Questionnaire	46
Table (3.5) Split-Half Coefficient method	46
Table (3.6) Reliability Coefficient Cronbach's Alpha technique	47
Table (3.7) One Sample Kolmogorov-Smirnov Test	50
Table (3.8) Total Variance Explained	51

### Chapter 4

Table (4.1): Profile of sample	55
Table (4.2) The ability of women to work in the field of engineering "Civil engineer"	58
Table (4.3) The ability of architect women engineer to work in the field of engineering	60
Table (4.4) The ability of ccommunications women engineer to work in the field of	61
Table (4.5) The ability of computer women engineer to work in the field of engineering	62
Table (4.6) The ability of industry women engineer to work in the field of engineering	64
Table (4.7) Comparison for each discipline related to the first group	65
Table (4.8) The ability of overall sample of all discipline of women engineer	68
Table (4.9) Male dominance on the engineering profession "Civil engineer"	69
Table (4.10) Male dominance on the engineering profession "Architect engineer"	71
Table (4.11) Male dominance on the engineering profession "Communication engineer"	72
Table (4.12) Male dominance on the engineering profession "computer engineer"	73
Table (4.13) Male dominance on the engineering profession "industry engineer	74
Table (4.14) comparison for each discipline related to the second group	76
Table (4.15) Male dominance on women working in engineering	79
Table (4.16) The personal qualities of an engineer women engineer "Civil engineer"	80
Table (4.17) The personal qualities of an engineer women engineer "Architect engineer"	81
Table (4.18) The personal qualities of an engineer women engineer "communication engineer	82
Table (4.19) The personal qualities of an engineer women engineer "computer engineer"	83
Table (4.20) The personal qualities of an engineer women engineer" industry engineer	84

Table (4.21) Comparison for each discipline related to the second group	87
Table (4.22) Social value and prestige related with engineer "civil engineer"	88
Table (4.23) Social value and prestige related with engineer "architect engineer"	89
Table (4.24) Social value and prestige related with engineer "communication engineer"	90
Table (4.25) Social value and prestige related with engineer "computer engineer"	91
Table (4.26) Social value and prestige related with engineer "industry engineer"	92
Table (4.27) Comparison for each discipline related to the forth group	93
Table (4.28) Work environment and working hours "Civil engineer"	95
Table (4.29) Work environment and working hours "Architect engineer"	96
Table (4.30) Work environment and working hours "Communication engineer"	97
Table (4.31) Work environment and working hours "Computer engineer"	98
Table (4.32) Work environment and working hours "Industry engineer"	99
Table (4.33) Comparison for each discipline related to the group number five	100
Table (4.34) Work environment and working hours	102
Table (4.35) Family and parents "Civil engineer"	103
Table (4.36) Family and parents "Architect engineer"	104
Table (4.37) Family and parents "Communication engineer"	105
Table (4.38) Family and parents "Computer engineer"	106
Table (4.39) Family and parents "Industry engineer"	107
Table (4.40) Comparison for each discipline related to the group number six	108
Table (4.41) Family and parents of overall sample of all discipline of women engineer	110
Table (4.42) "Discrimination against Women" "Civil engineer"	113
Table (4.43) "Discrimination against Women" "Architect engineer"	114
Table (4.44) "Discrimination against Women" "Communication engineer"	115
Table (4.45) "Discrimination against Women" "Computer engineer"	115
Table (4.46) "Discrimination against Women" "Industry engineer"	117
Table (4.47) Comparison for each discipline related to the group number seven	118
Table (4.48) Discrimination against women of overall sample of all discipline	122
Table (4.49) "Historical role of women" "Civil engineer"	123
Table (4.50) Historical role of women "Architect engineer"	123
Table (4.51) "Historical role of women" "Communication engineer"	124
Table (4.52) "Historical role of women" "Computer engineer"	125
Table (4.53) "Historical role of women" "Industry engineer"	126
Table (4.54) Comparison for each discipline related to the group number eight	128
Table (4.55) "Culture" "Civil engineer"	129
Table (4.56) "Culture" "Architect engineer"	130
Table (4.57) "Culture" "Communication engineer"	131
Table (4.58) "Culture" "Computer engineer"	131

Table (4.59) "Culture" "Industry engineer"	132
Table (4.60) Culture of overall sample of all discipline	133
Table (4.61) Comparison for each discipline related to the group number seven "Culture"	134
Table (4.62) Group number ten "Civil engineer"	136
Table (4.63) Group number ten "Architect engineer"	137
Table (4.64) Group number ten "Communication engineer"	138
Table (4.65) Group number ten "Computer engineer"	138
Table (4.66) Group number ten "Industry engineer"	139
Table (4.67) Comparison for each discipline related to the group number ten	140
Table (4.68) Ranking of factor group are affecting women career choice of engineering discipline	141
Table (4.69) Factor that influenced your decision to further your career in engineering	143
Table (4.70) The most factors that affecting on women to choice other sector than engineer	147
Table (4.71) Popularity of engineering disciplines	147
Table (4.72) Relationship between culture and choices of profession and career success	148
Table (4.73) Opinion of women engineer with engineering discipline	149
Table (4.74) Company questionnaire	151
Table (4.75): The ten-factor solution	155
Table (4.76): Comparison between factor analysis and relative important index "RII"	157



## List of Figures

### Chapter 2

Figure (2.1) Engineering Degrees Awarded by Gender	19
Figure (2.2) Percentage of Engineering Degrees Awarded to Women by Discipline	19
Figure (2.3) Global Gender Gap index ranked	22
Figure (2.4) Women participation rate in the workforce	22
Figure (2.5) Growth women participation in the workforce in UAE	23

### Chapter 3

Figure (3.1) Methodology Flow Chart	30
Figure (3.2) Scree plot	50
Figure (3.3) KMO and Bartlett's Test	52

# CHAPTER 1

## INTRODUCTION

No topic is more complex than that of the role of women in our societies. And it is made even more complex because of the lack of information about the multiple forces that act on women as they navigate a life path between competing interests in family, school and work. The involvement of women in engineering field is growing, women are observed as minority in this field. The growing demand for qualified engineers will soon reach a critical level. Berrais (2010) cited that jobs in the Arab world are growing most rapidly in areas that require science, engineering, information technology, and technical knowledge and skills. Some business leaders are warning of a major shortage in skilled Arab workers primarily in information technology and technical knowledge that threatens the ability to compete in international marketplace.

The choice of a university discipline and the subsequent career is one of the most important decisions that one will ever make. In the last one hundred years women have enjoyed a more prominent role in the society, increasingly influencing social, cultural, economic and political spheres. The number of women in the workforce has grown steadily around the world with strong representation of women in many careers. Nelson and Veltri (2011) cited that women account for 58% of college not workings in the UK, 65% in the United Arab Emirates, 58 % in the USA, 60% in Brazil, 47% in China. Further, women have made significant strides into leadership positions both in private and public sectors: in 2011 women accounted for 19.8% of members of national parliaments worldwide (Inter-parliamentary Union, 2011).

Alexander et al. (2010) mentioned that the engineering profession has not been as successful in attracting women as other previously male-dominated fields such as law or medicine. While the climate for women in engineering has been slowly changing over the years, lack of encouragement, peer pressure and other factors still act as barriers preventing more women from pursuing a career in this non-traditional field. Geertsema (2007) cited that when women enter a new non-traditional career path they can be challenged by society to prove their capability. Some men and women assume that women are incapable of performing in a construction company until they prove themselves to be capable. The conception is there, for example, that women are unable to supervise men and are unable to combine work and family responsibilities.

Ofori (2011) cited that women constitute a large talent pool. The construction industry should encourage women to join it and grow as leaders. These leaders would be role models who would also serve as magnets for attracting other women. With more women attracted to the construction industry, the sector would be in a better position to cope with the talent crisis it faces currently. Also, the social image of the industry could be enhanced. Madikizela and Haupt (2010) mentioned that organizations that seek to unleash the potential of women and take advantage of the softer side of leadership need to formulate strategies to develop the next generation of female leaders.

## 1.1 Problem statement

### **The research problem may be stated as follows:**

Considering the perceived unattractiveness of some engineering disciplines as a career choice for women and a low number of women are choosing careers in some engineering disciplines like construction industry. Women traditionally have not been employed in the construction industry in any number to be considered. Within the industry, research must be done to determine why women are not entering the construction workforce. Gale (1994) mentioned that the construction industry is perceived as being the epitome of crisis, conflict and masculinity manifesting in the unsociable, confrontational behavior that discourages women and ethnic minorities from considering construction as a meaningful career. Although involvement of women in the engineering field is growing, there is a lack of women empowerment in many engineering disciplines. According to Berrais (2010) the enrollment statistics of women in engineering in some Arab countries are impressive as compared to the weaker numbers in US universities. Information about the career paths which engineering women follow after graduation is not adequate to enable any one to declare victory over gender differences. Certainly patterns of women's enrollment in engineering disciplines sometimes reveal cultural constraints and restrictions in potential employment. Shortage skills of engineering women can lead to low number of engineering women working in different engineering disciplines. Also society's perception of unjust for women who work in some engineering disciplines and according to society's ideology, if engineering women have the ability and the determination they are on their way to a successful career. This ideology is contradicted by the discriminatory treatment of women in various occupations, but also in the construction industry. There is also discrimination where women not working, experience cultural discomfort, segregation and unequal power relations. There is discrimination in the sense that women are often barred or discouraged from entering certain occupations. Another factor effect on women choice her career in engineering is harsh working environment that does not fit the nature of women in many engineering discipline since engineering has a popular image of being tough, heavy and dirty. Therefore, this thesis will be conducted to study and investigated the factor affecting women choice her career.

## 1.2 Research scope and objectives

The aim of this research is to identify the factors that influencing the choice of career in different engineering disciplines by women in Gaza Strip.

### **The primary objectives of this research are:**

1. To compare between different engineering disciplines related to the factors affected in women career choice.
2. To investigate the attitude of engineering women concerning developing their future career. And barriers to women entering and working within different engineering discipline.
3. To determine the popularity of some engineering disciplines as career for women.

4. To investigate the relationship between culture background and the effect of perceived image of the engineering disciplines on recruiting the women.

### 1.3 Hypotheses

1. Null hypothesis(Ho): Women have ability to work in the field of engineering.  
Alternative hypothesis (H1): Women don't have the ability to work in the field of engineering.
2. Null hypothesis (Ho): Male dominance of some engineering disciplines is a primary negative factor that discourages women from embarking on careers in engineering.  
Alternative hypothesis (H1): Male dominance of some engineering disciplines is a primary negative factor that discourages women from embarking on careers in engineering.
3. Null hypothesis (Ho): The work environment of some engineering disciplines militates against women's ability to work.  
Alternative hypothesis (H1): The work environment of some engineering disciplines that help women's to work.
4. Null hypothesis(Ho): Family and parents have significant effect on women choice her career in engineering.  
Alternative hypothesis (H1): Family and parents don't have significant effect on women choice her career in engineering.
5. Null hypothesis(Ho): Discrimination against women discourages women from choosing career in engineer.  
Alternative hypothesis (H1): Discrimination against women encourages women from choosing career in engineer.
6. Null hypothesis (Ho): The cultural upbringing of women influences their choice of careers in the engineering disciplines.  
Alternative hypothesis (H1): The cultural upbringing of women doesn't influence their choice of careers in the engineering disciplines.

### 1.4 Research justification

It is important to the engineering profession to know why engineering women prefer some engineering profession than other and what are the factors effects on them to choose this profession. Engineering has always been a male dominated profession. Despite the involvement of women in engineering field is growing, women are observed as minority in this field. The growing demand for qualified engineers will soon reach a critical level. According to Berrais (2010) jobs in the Arab world are growing most rapidly in areas that require science, engineering, information technology, and technical knowledge and skills. Some business leaders are warning of a major shortage in skilled Arab workers primarily in information technology and technical knowledge that threatens the ability to compete in international marketplace. However, universities and engineering industry have begun to recognize the need for engineering women and are actively recruiting young women to enter this filed. This research will be done in Gaza Strip, since there is no research done in this field before, so this research in this area will be done in fully comprehensive and extensively then compare the result with previous studies in other country.

## **1.5 Limitations of the Study**

**This research is subject to the following limitations:**

The students sample will be limited to students registered in different engineering disciplines in Islamic university in Gaza strip. Limited number of working engineering women in engineering field, lack of written policy found in organizations for equity between women and men engineers.

## **1.6 Methodology**

The chosen research method in this study is a quantitative approach. An extensive review of the literature related to the research topic will be done that will include a survey of previous studies in the field to achieve the objectives of the study. The quantitative research will consist of a questionnaire developed from the literature review, the questions were mostly closed and involved yes/no questions, circling answers or ticking boxes on a table, some more open ended questions were included to address how women were influenced to study a career in different engineering disciplines. Collected data will be statistically analyzed using the Statistical Package for Social Sciences (SPSS) version 18 and the findings from this analysis will be discussed and compared against the literature reviewed. Conclusions will be drawn from the analysis and recommendations will be made for further studies relative to the subject.

## **1.7 Chapter Divisions**

### **Chapter 1: Introduction**

This chapter provides an introduction to the research and acts to focus the reader on the study context.

### **Chapter 2: Review of literature**

A literature study was done with information acquired from books, journals, articles and conference proceedings, covering the facts and the suppositions available. This chapter will highlight and discuss literature on the discrimination against women, the construction industry as well as past and current legislation relative to discrimination, in order to formulate an understanding of the subject of the study. Literature on past research conducted, which is relative to this study, will also be discussed.

### **Chapter 3: Methodology**

The research methodology is described in detail and the analysis of the data using the SPSS application version 18 will be presented in this chapter.

### **Chapter 4: Result and discussion**

This chapter presents research results. It includes the questionnaire design, the method of analysis, and analysis of the surveyed results and discussion of these results.

## **Chapter 5: Conclusions and recommendations**

In this chapter, the study will be summarized, with conclusions being drawn from the research findings; recommendations will be made relative the domino effect of the comparison of the literature to the findings.

There are three Annexes, which supplement these chapters. They are:

Appendix 1: The questionnaire (Arabic Version).

Appendix 2: The questionnaire (English Version).

Appendix 3: The questionnaire validity

## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 Introduction

The career choice process occurs throughout the life cycle as individuals make a series of decisions that have occupational consequences. Madikizela and Haupt (2010) mentioned that generally young people start contemplating their career choices around the age of 16 or in their last years of high school. Historically, a woman was first and foremost a wife, whose life was centered in her home and family. This common perception has historically led to women being employed in traditional careers like teaching and nursing. Thompson (1997) mentioned gender-based career stereotyping makes it particularly difficult for young girls to establish their own career choices or to diverge from the career choices that their parents dictate.

One of the most striking phenomena of recent times has been the increasing proportion of women in the labour force, enabling women in many regions to use their potential in the labour market and to achieve economic independence. Hart (2007) states that the extreme demand ensured an exponential growth of 10.5 % women employed in all levels of engineering to 35.2 % by 1943 with the official classification of women doing men's work and those doing women's work. Arslan and Kivrak (2004) mentioned that in most country in the world there is very much effort in order to increase the women employment in the workforce. As a result, many women entered into the working life and they became pilots, doctors, engineers, teachers, instructors, etc. Early in the 20th century, few women participated in the labor force. Davis (2002) cited that over the last century, the issue of women in the workplace has been a tumultuous one. Noordenbos (2002) cited that in the fields of employment in the different sciences and engineering most national academics only elected their first female members in the 20th century after the Second World War to be employed as academic's.

#### 2.2 Career decision-making in engineering

Studies on the factors impacting the career decision-making process have been examined in a number of countries. Engineering in the UK has a popular image of being tough, heavy and dirty. These powerful cultural images have helped to reproduce occupational segregation whereby engineering is perceived as unsuitable for women (Powell, 2006). Construction is well known as a male-dominated industry with a strong masculine culture (Sommerville et al. 1993, Dainty et al. 2000, Fielden et al. 2000, Agapiou 2002). Fielden et al. (2000) mentioned that the first factor to consider in understanding the shortage of workers is the construction industry's problem with 'image', which makes both men and women reluctant or uninterested in the industry. This problem is compounded by a general lack of knowledge and information about the industry, the career opportunities available, and what qualifications are required. Also societal factors are also affecting the construction industry's ability to hire women. While there are various routes into the construction industry, either through the crafts and trades, higher education, or working

qualifications, almost all routes require prior education in subjects such as mathematics, science, and technical drawing.

Agapiou (2002) conducted an empirical review of the attitudes of school-age girls, their parents and educators about career prospects in construction. His study found that the reservations held by the girls are mostly to do with issues such as the physical nature of the work; the social dynamics of working in a male-dominated environment and the availability of career paths following completion of apprenticeship training. Some of the factors impacting the career decisions were identified as follows: other family members, peers, exposure to experiences; recognition of their own aptitudes and preferences; and exposure to role models.

Until today the construction industry with its extreme gender stratification is still conservative in its recruitment of women. The prevalent social conditions underpins the occupational segregation of the labour market into masculine and feminine jobs is as imperforate today as it was at the beginning of the century, with construction as the prime example. The majority of women working in the construction industry undertake administrative, technical and professional work while the intake at the operative level is very low and the data are scarce to non-existence, but in most countries these represent less than 1% of the workforce (Clarke et al., 2005). Inevitably it can be concluded that construction is not only male-dominated but is devoid of female participation.

Fleming et al. (2005) in his study conclude that the students choose studying an engineering effected by many factors, the result is Seventy-five per cent of participants indicated that the enjoyment of mathematics and science and financial concerns were primary motivational factors in their pursuit of an engineering education, most students did not identify family influences as a persistence factor in the survey, although those who did had strong feelings about the influence of family, also the survey finding that large numbers of students are motivated by money to persist in engineering was supported by comments by students in both types of interviews.

### **2.3 Women and working professionalization in engineering**

The careers of women have been characterized by limited opportunities, low paid part-time work, breaks of different lengths for childcare and other domestic responsibilities, and unhelpful assumptions about commitment and capability. This is true both for women in general and women aspiring to be managers. Upward mobility remains, however, one of the conventional measures of organizational and career success (Wilson, 1998). A fundamental aspect of the disinclination theories rests upon women being rationally and/or physiologically inclined to take on the domestic role within a relationship, including childcare. This inclination would then manifest itself in a disinclination to pursue a career or higher-level management responsibilities within the work place (Louise, 2001).

Lane (1997) cited that Engineering is a subject where women are currently disastrously underrepresented. That women remain a minority in engineering has been explained in various ways, including poor or inadequate career guidance prior to entering university;



early differential socialization of males and females; lack of support from family, friends and working engineers; cultural and occupational barriers (Dryburgh, 1999). Sagebiel (2003), for example argues that various studies have shown that what drives women away from technology are not women's deficits in abstract thinking, but the content and climate prevalent in academia, which construct an atmosphere of dominant masculinity. Layne (2009) mentioned that the biggest problem limiting the enrollment of women in engineering is the general public lack of knowledge about engineering; also he cited that the American women's movement focused on the sciences rather than on engineering because the latter lacked cultural authority.

Sagebiel (2003) cited that women are not driven away from technology because of lack of ability, but rather because of "an atmosphere of dominant masculinity". While numerous initiatives have been employed to increase the proportion of women entering engineering education and employment, their impact has been limited and increases in engineering women students have failed to translate into a proportionate increase in female engineering working s.

## **2.4 Female engineers and engineering jobs**

Generally, the employment of women workers is unstable as a result of various factors which can be attributed to the organizational stereotypes or to the women themselves. It is still stated statistically that women employment in industries is only 10 or 15 percent. The absence of these would be "leaders" could discourage young girls from being attracted to male-dominated professions Agapiou (2002). Jobs in the Arab world are growing most rapidly in areas that require science, engineering, information technology, and technical knowledge and skills. Some business leaders are warning of a major shortage in skilled Arab workers primarily in information technology and technical knowledge that threatens the ability to compete in international marketplace. However, universities and engineering industry have begun to recognize the need for engineering womens and are actively recruiting young women to enter this filed Berrais (2010).

Newton (1988) cited that engineering as a profession was changing with less emphasis placed on the older heavy type of engineering. In its place are computers and chips, printed circuit boards and electronics. However, it was revealed that women in engineering are not dramatically different from women in the more traditionally feminine fields, or from their male engineer counterparts. The percentage of women employed in the construction industry globally is less than 10%. The percentage of women that are working ly registered or act as role models and leaders by managing their own construction firms is even less (Geerstemar, 2005).

## **2.5 Underrepresented women in different engineering disciplines**

Despite recent changes, women continue to be a small minority in working engineering. Ferguson and Sharples (1994) cited that the profile statistics of women in the non-traditional work in the USA is that 57 % has a High School qualification (as their highest qualification) and 43 % has a college qualification. The age of the women on entering the

non-traditional jobs showed that 11 % of the women were younger than 20, 57 % were between 20 and 30 years of age and 32 % were older than 30. The average age of the women in the non-traditional jobs was 36 years. This profile also showed that 30 % of the women were married and that 46 % of the working women had children. Fielding and Glover (1997) mentioned that the approximate number of men will continue to be very high and this pattern is repeated in other European countries as well as in North America that leads to be engineering is the most male dominance discipline.

Chowwen (2003) said that most women are employed in low-paying, traditionally female careers and work such as nursing, teaching, social work, sales, care taking, and administrative support positions. Women are underrepresented in engineering, science, mathematics and technology education and careers in different region of the word.

Fielden et al. (2000) said that the construction industry is not only the most male dominated of all the industries in the world, but it also appears to exhibit the greatest degree of vertical segregation. Dainty and Edwards (2003) mentioned that the forecast by the Construction Industry Training Board (CITB) in the UK indicated that around 76000 new recruits in the construction industry will be required each year for the period 2002-2006. Of these, approximately 14000 managerial and clerical staff and 4500 construction working s will be required each year in order to account for the retirements from the sector and forecasted expansion of the market. The demand for construction managers therefor ranks as the second highest occupational category for the industry over the next four years. Yet, predictions generated from the CITB's econometric employment model suggest that the industry will have a net shortfall of 7000 construction manager's year-on-year in the near future.

Ferguson and Sharples (1994) discusses that for the individual women, working in the non-traditional jobs, their achievements represented the forging of a new frontier. Socially they represent a new reality. Non-traditional construction industry jobs offer well-paying careers where sometimes previous formal education or training was not needed. Even though these employment opportunities are not publicized as being available to women, more women are learning of them.

## **2.6 Factors affecting in women career choice**

### **2.6.1 Parents and family**

Kassim et al. (2011) mentioned that girls indicated that their interest or lack of interest in technical courses was based on their parents' opinion about the field of study. Borchert (2002) cited that parents are potentially an important source of information and support to their children on sexual issues, both parents and children are keen for a significant part of sex education to take place in the home. In practice, however, it appears that many parents feel that they lack the skills and confidence to play a direct role in sex education. Experience from the USA and Europe suggested that parent education programs can have positive effects on the quality of sex education that parents can offer. Otto (2000) investigated young people's perceptions of parental influence on their career development

and concluded that both boys and girls look to their parents when they make career choices. Parents who believe that their own role is important for their children's achievement tend to be more controlling and to be keener in developing the child's interest (Georgiou, 1999). Badolato (1998) cited in another study that girls and women faced inequities, did not achieve at their expected levels, and did not choose career options compatible with their cognitive abilities. Burlin (1976) mentioned that the occupational status and educational level of females' parents have had a significant impact on their career choice.

Family processes of interaction and communication, as well as beliefs and attitudes, influence what the child learns about work and work experiences. Domenico and Jones (2006) found the social status of mothers' occupations, as opposed to the social status of fathers' occupations, had a stronger correlation with the social status of female students' career aspirations. The researchers attributed this finding to the fact that mothers exhibit a greater presence in many homes. Also they noted the positive relationship between teenager females' career aspirations and their mothers' educational achievement. Cunningham (2001) cited that parental influences are transmitted through children's gender role assignments in the homes, and in some societies girls are limited to certain roles, while boys have almost unlimited roles. Burlin (1976) deduced career choices and aspirations in females were significantly predisposed by the mother's type of work. In an early study of college women, Burlin determined daughters of working mothers chose a life pattern comparable to their mothers more often than life patterns comparable to their fathers, and findings reiterated the importance of mothers as role models in the development of their daughters' career goals and aspirations.

Agapiou (2002) cited that there is a general perception among parents and girls that if a woman wanted to work in a particular area she would be 'generally accepted by her co-workers'. Despite the belief by many parents 'that girls can do anything, there remain tensions for some parents between wanting to support their daughters, yet at the same time being reluctant about the difficulties that may be encountered. As one mother said 'As much as we have nice airy-fairy ideas and they may be policies written on paper, the reality is we live in a society where everyone will look after themselves and I don't believe too many employers will take on trades women as yet. It's still an unknown quantity' While parents and significant others do have influence over what subject options are chosen by their daughters and what outcomes they may lead to, it appears that the girls themselves exercise a degree of control over what they choose to study at high school. With many parents being subject to time constraints, they may find it difficult to consult key personnel in schools and therefore rely on information coming home with the students. Fielden et al. (2000) mentioned that parents, teachers and school children believe that jobs in the construction industry are limited to bricklaying, joinery, and painting and decorating. Construction is still viewed as a highly gendered activity, which is perpetuated by the industry itself through its continuing use of gender, biased terminology, such as, for example, craftsman, chain boy or foreman.

to aspirations of youth. Furlong (1986) has concluded that the influence exerted by the educational system is limited, given the strength of parental influence. Burlin (1976) cited that teenager females in particular, career choice was strongly influenced by the mother's occupation. The mother's occupation was credited with impacting children's aspirations

because children often attended work with their mothers and were more likely to know what their mothers did for a living. Arslan and Kivrak (2004) mentioned that in his survey, the participants agreed in that the construction industry has a male-dominated nature. It was found that female students mostly chose a career in construction because of their parents or relatives who are related to the construction industry. Either the parents or relatives are the owners of a construction company or the members of a construction organization. Mau and Bikos (2000) cited that parents' educational level has been positively related

### **2.6.2 Masculinity and feminization of engineering**

A cursory glance at the different engineering fields all over the world and in Gaza Strip particularly reveals that the fields are dominated by men and the profession regarded as a male domain. The masculinity surrounding the image of engineering over the years remained very powerful and in turn reinforced the belief that the field is unsuitable for women other than men. Women until recently formed a small percentage of total enrolments in university engineering departments all over the world. Agapiou (2002) cited that the image of construction is that of a male-dominated industry requiring brute strength and tolerance for outdoor conditions, inclement weather and bad language. Gale (1994) mentioned that the construction industry is perceived as being the epitome of crisis, conflict and masculinity manifesting in the unsociable, confrontational behavior that discourages women from considering construction as a meaningful career.

Badekale (2003) wrote on the traditional image of engineering as being heavy, dirty and masculine, while a woman who would succeed in the field had to be tough, aggressive and masculine. If she does not possess these characteristics, then she must work in menial jobs requiring manual dexterity and "nimble fingers". As highlighted by Newton (1988), less emphasis is now placed on the "older heavy type of engineering", while talk is more and more about computers, printed circuit boards and electronics. Furthermore, the roles of women and men have been changing, with women's liberation and empowerment, movements and changes in economic conditions altering the division of labour. Sheridan (1984) affirmed that in the United States, the number of women who matriculate into and not working from engineering faculties have increased over the past decade, while women form about 20 percent of beginning engineering students. They opined that there had also been changes in attitudes towards the roles of women and the probable changes in women's own perception of their capabilities. It must be observed rather enthusiastically that though there are increases in women enrolment, much is still needed to improve the lot of women. Several developments have brought about this shift in the traditional view of science and engineering as perceived by men and women.

Arslan and Kivrak (2004) mentioned that in his survey, the participants agreed in that the construction industry has a male-dominated nature. Furthermore, male civil engineers working in public establishments as managers stated that women were not appropriate for the construction industry. They said that women did not want to work at construction sites, which are far away from their locations. Women do not want to stay overnight at sites and do not work nightshifts and weekends. Female civil engineers stated that they prefer to work in technical office rather than construction sites. Fielden et al. (2000) cited that

women surveyors reported that women in construction identified it difficult to fit in with male colleagues' work and social activities. Greed (2000) stated that most men do not know how to treat women in construction and they were frequently embarrassed.

### **2.6.3 Culture**

Culture is a term that has various meanings and pertaining to this context, it is defined as "the set of shared attitudes, values, goals and practices that characterizes an organization, organization or group" (Taylor, 2010). Culture plays a major role in defining an individual their beliefs and attitudes towards certain things. Similarly, culture has a major influence on why women have chosen or been restricted from choosing different discipline of engineering. The construction industry has a male-dominated culture. Fielden et al. (2000) discuss in his study that women in construction identified it difficult to fit in with male colleagues' work and social activities. Greed (2000) stated that most men do not know how to treat women in construction and they were frequently embarrassed. Women who are attracted to the construction industry face the same stereotypical barriers as women in other sectors. In this male-dominated profession there are added stereotypes regarding the nature of the profession and the working s themselves (Jayne et al.,1999).

Numerous research studies indicate that women who seek entry into male-dominated cultures either have to act like men in order to be successful, or leave if they are not adaptable to the culture, or they can remain in the industry without behaving like men but maintaining unimportant positions (Jayne et al.,1999), also authors mentioned that however, faced with this organizational barrier, some women still seem able to gain a higher degree of career satisfaction and optimism than their male counterparts, as they continue to enter formerly male roles. Gale (1994) uses the following key words to describe the construction industry culture: crisis, conflict and masculine. Consequently, women working in this industry are faced up to several difficulties within this culture. Women consider themselves very much in a minority.

### **2.6.4 Sex discrimination and harassment on site**

Sex discrimination exists when a person or group of people are treated unfairly solely on the basis of their biological sex (Quick Takes, 2011). Also, define Sexual harassment as "unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature such that submission to or rejection of this conduct explicitly or implicitly affects an individual's employment, unreasonably interferes with an individual's work performance, or creates an intimidating, hostile, or offensive work environment."

Fielden et al. (2000) mentioned that women are deterred from applying for job positions within the construction industry by informal recruitment procedures and advertisements. Since construction industry is very technical, very demanding and has exhausting and taxing hours to work where every hour and every mistake can cost a firm huge amounts of money. With that, tolerances on sites are not always very high and behavior of people through words and deeds are often of a rough and an aggressive nature.

Lauer (2010) showed discrepancies among hiring and promoting women in engineering. There is discrimination in the sense that women are often barred or discouraged from entering certain occupations. For the most part of our history women have been notably absent from the sciences and engineering. When women have the same educational qualifications, time on the job and occupational attitudes, women are less likely than men to achieve high-status positions or to move into management. Perreault (1992) mentioned that women must learn how to effectively address and cope with aggression, foul language, sexual harassment, intimidation and rejection in the construction industry. They must also avoid being labeled as extremists, outspoken and emotional in their interpersonal dealings with men. Women are not taken seriously by subordinate men, particularly older or hold university degrees men are often ridiculed.

Women are subjected to sex discrimination while entering to male-dominated work fields such as the construction industry. Discrimination against Female Engineers Attitudes prevalent in the construction industry towards women led to the following: Few women were usually recruited as employers thought that the management of their homes would prevent their effective performance on the job, and discrimination on promotion.

### **2.6.5 Working environment**

Women currently make up almost half of the U.S. work force and increasingly are moving into occupations, such as the construction trades, once held exclusively by men. There were 8.1 million construction workers, of which 2% were skilled tradeswomen. Construction is a dangerous industry: 17% of all fatal on-the-job injuries occur in construction, which also has a high rate of nonfatal injuries. While both men and women working in construction face many of the same risks, there are some unique issues that are of greater concern to women. The average fatality rate of 1.80 per 100,000 female construction workers was more than twice the all-industry average for women workers. Tradeswomen are more likely than their male counterparts to die in job-related motor vehicle accidents or from job-related homicide and less likely to die from falls. Of women killed by motor vehicles, 30% worked as so-called flaggers (Kumbhar, 2011).

Chileshe and Haupt (2010) cited that as increasing numbers of women enter the construction trades, concerns about their health and safety are growing. In addition to the primary safety and health hazards faced by all construction workers, there are safety and health issues specific to female construction workers. The small percentage of females within the construction trades and the serious health and safety problems unique to female construction workers have a circular effect. Safety and health problems in construction create barriers to women entering and remaining in this field. In turn, the small numbers of women workers on construction work sites foster an environment in which these safety and health problems arise or continue. Warren (2003) motioned that women choose a career in the construction industry if the work environment provides good working conditions, a sense of responsibility and is challenging. There has to be variety and a pleasant atmosphere with the prospect of continuous steady employment, bringing along a sense of security.

Geertsema (2007) cited that in recent years men have become far more accepting of women in the construction industry, yet for some women, who have broken into the business contend, it remains uninviting and at times downright hostile environment. The excitement of choosing the career is clouded by the reality of the circumstances. Some women state that male company owners frequently funnel subcontracts to their male pals, but a larger number of women are supervising construction sites and many of the project managers are now women. Many women are drawn to the varied nature of construction. The day to day tasks are different; the spectrum of colleagues varies from labourers to engineers to owners. The circumstances change quickly, requiring flexibility and responsiveness. Some women are drawn to the challenge of specifically entering a field seen as non-traditional for woman (Warren, 2003).

This confirms the indication that in the last ten years the views of tolerating women in the construction industry have changed significantly.

### **2.6.7 Working hours**

*Kumbhar* (2011) motioned that female construction workers are long hours away from their home. As there is no fix timing of working hours, they have to work for long hours. Early in the morning when they leave their home, their children are in sleep and again when they returned at late night, most of the children are in sleep. Remaining all the time their children are on the mercy of God. Hence, very little time they came into the contact with their children. Arslan and Kivrak (2004) cited that long working hours and working in vulnerable weather conditions are the nature of the construction industry. Especially, towards the end of a contract, hours of work tend to increase. For every project, sites are established in the project area. Thus working locations show variable for site-based employees. Moreover, workers are employed generally on project basis. Permanent stats are rarely available. So, workers can face long periods of unemployment between contracts.

*Kumbhar* (2011) motioned that the nature of employment in construction activity is seasonal and uncertain. No one, either contractor or owner is ready to give an assured of work. In rainy season construction sector take a halt, which results in shrinkage the demand of unskilled workers. Maximum (99 per cent) women engaged in construction work are doing unskilled work or job. Hence, the first axe of unemployment falls on women, at the time of depression in construction sector. Temporary nature of work always push female workers in chain of problems like no work no wages, low earnings, poverty, low social status and dirty living environment. Etzkowitz, et al. (1994) showed that women preferred an industry with regular working hours where they could plan their daily tasks and duties, especially if they had a family. Bon and Hughes (1992) mentioned in their study that the number of hour's women predicted they would work, was less than the number of hours men predicted they would work. With respect to the actual number of hours worked, women worked significantly fewer hours per week than men did. The reasons for the differences seemed to be more by choice, but in some instances were forced where the men had the more senior positions and were required to work more hours.

### 2.6.8 Financial discrimination

Women continue to receive lower salaries than men for comparable work. The women worry about their futures especially when the economy is slow and there is job insecurities and redundancy. *Kumbhar* (2011) cited that Wage discrimination is the common phenomena in Indian economy. In construction sector, also females are paid less than male. In our observation we found that wages of a female worker was Rs. 40 per day less than a male worker. The ongoing per day wages of female workers was Rs. 80 and a male worker were Rs. 120. In house construction activity, male and female unskilled workers doing near about the same work; yet female workers got 30% less wages than male workers.

Geertsema (2007) mentioned that women tend to cluster in the lower levels of remuneration of virtually all occupational categories. Where it is common to relate income to education, occupational category and proportion of time worked, when the income of women was compared to that of their male colleagues with the same criteria the women earned less. Men generally had higher average income in every single occupational category.

Women are expected to be secure and satisfied with the comparatively lower wages they earned from government and less challenging organizations where they have limited working hours. Any woman who therefore wanted a better, fair and equal remuneration sometimes regarded as being greedy and selfish. Such women are faced with a lot of opposition and poor cooperation from colleagues.

### 2.6.9 Family responsibility

Women have an important role in family as well as in society. Naturally, there have been sexual and physical differences between women and men. Pregnancy, motherhood including birth and suckle phases affect their working life as their whole life. Especially, working in positions requiring physical strength or working in dangerous and tiring environment might cause inconveniences for women's and their child's health. Since woman place is in the home this is common perception, so in our society all family responsibilities is located on the women, if the women is employment out the home or not. Family responsibilities are like children care, cooking, clean housing, visit relatives; engage in social network of the family, and other responsibility. There is no excuse for working women by a husband and society. And there is no co-operation between men and women in social life. Also, our society does not include places equipped and cheap to take care of children and considered this an obstacle to working women's. Only very few women occupied important jobs.

Hill (2010) cited that many people think that women leave STEM "Science, Technology, Engineering, and Mathematics" academic careers because they cannot balance work and family responsibilities. In business and industry both women and men identify family responsibilities as a possible barrier to advancement, but women are affected differently than men by this "family penalty". Although both women and men feel that having a family



hinders their success at work, women are more likely than men to report foregoing marriage or children and delaying having children (Frehill et al., 2009).

Fearfull and Kamenou (2006) stated that women often make their 'choices' with their family circumstances and responsibilities in mind. Ferguson and Sharples (1994) mentioned that balancing job and family responsibilities proved the most important criteria and consideration when attracting women to the profession. Outside forces such as the need to take care of themselves and their children are very important to women.

#### **2.6.10 Intellectual and physical capability**

Aulin and Jingmond (2011) stated that most women seem to agreed that they can cope with the physical part of the job, while many claimed that they need to be psychologically strong to be on a building site. The women on site feel that they need to be as good as the men. They also need to fit into the accepted behavior of the workplace which can even mean comprising their 'female' identity (Clarke et al., 2005).

Matope (2007) found that it was evident that the female engineering students are as intellectually competent just as boys to comprehend all the engineering tasks as indicated by 77% of the lecturers. However, 61% of the lecturers strongly agreed that female engineering students could not cope physically as boys with the manual tasks which engineering at times called for. Nevertheless, this should not rule out females from engineering because their short-comings in physical fitness might lead them into designing machinery to overcome this weakness. Since they were observed to be intellectually competent, they might even invent new devices to enable them to perform better and efficiently in engineering jobs. This would ultimately lead to an improvement in the available engineering technology.

#### **2.6.11 Job opportunities and societal need**

In exploring the consequences of careers in which there may be limited job opportunities, Jones and Larke (2005) in his study results revealed that respondents perceived the opportunities for viable, prosperous careers in any jobs field as being very limited. The perception of having limited job opportunities led respondents in this study to choose other careers.

Azizzadeh et al. (2003) stated similar data, his study shown career opportunities, meaning demand for such careers attracted students to the field. Ososki et al. (2006) study revealed that students viewed teaching as a career that offers limited job opportunities, poor career progression and limited promotion opportunities. It was reported that teachers are not rewarded for good performance.

**In 2012, In the Gaza Strip** Bulletin Engineers Association disclaimer to high school students to think carefully before studying engineering for lack of employment opportunities, and increase the number of engineers don't work in the Gaza Strip and in the same disclaimer has published the number of engineers who are working and the number of

engineers don't work, in a reference to the importance of finding jobs after studying. This indicated the importance of this factor "job opportunities and societal need" on choosing the career.

### **2.6.12 Career Knowledge**

Fielden et al. (2000) said that the image problem about the construction industry makes both men and women uninterested in the industry, is compounded by a general lack of knowledge and information about the industry, the career opportunities it can offer and the qualifications that are required. The CITB (2003) found that parents, teachers and school children believe that the jobs in construction industry were limited to bricklaying, joinery, and painting and decorating. It is also found that teachers, parents, career advisors and school students have only a vague, superficial knowledge of the industry. Careers teachers and careers advisors were perceived by school students, undernot workings and not workings to provide inaccurate and inadequate information on the construction industry. Owing to the variety of courses and diversity of career paths even working s careers advisers find the subject of careers advice for construction confusing (Gale, 1994).

Knowledge of the nature of construction industry working occupations, higher education routes to working status and career opportunities in construction were seen as extremely important by school students considering a degree in construction. Therefore careers about an industry must be transmitted to school students (Gale, 1994). The decision of selecting a career in the construction industry should be taken well in advance at schools level particularly by those who intend to be a construction working in the future. The more that schools students of both sexes know about the construction industry the more likely that both sexes are to select a career in the construction industry.

### **2.6.13 Prestige of a career**

Cutler et al. (2006) indicated that personal factors such as prestige, personality type and lifestyle preference played an important role in future career choices. Singaravelu et al. (2005) examined factors influencing students's choice of major subjects and found that out of 214 undernot workings (144 international and 70 domestic), status and prestige of a career were more important considerations for international students than for the domestic students. Prestige can be linked to the Wilkinson (1996) study, which highlights that in 9 years perceptions have not changed.

Cutler et al. (2006) conducted a study to investigate medical students's perceptions of the field of psychiatry and to identify the impact of these perceptions on their career choices, and this study found that all respondents, irrespective of their class or their level of interest in a career in psychiatry, generally rated status and prestige of psychiatry as having a negative impact on their interest in the field.

Baboolal and Hutchinson (2007) found that financial reward and prestige were major factors influencing their choice of career. Fleming et al. (2005) found that financial reward was a key motivational factor for one's choice of career. The researchers examined the

impact of potential earning power and prestige on both engineering and non-engineering majors. The results revealed that female engineering students, unlike their non-engineering counterparts, reported that financial reward and prestige were of great importance to their career choice.

Ososki et al.(2006) investigate in his study the factors affecting science undernot workings choices of teaching as a career and found that students, who were not considering teaching as a career, saw teaching as a low status job, negatively perceived in the community and by semi-working s. It was also found that parents in the study commented that low university entrance requirements for aspiring teachers had lowered the status of teaching and resulted in a lower quality teaching force with lower pay.

#### **2.6.14 Employers' attitudes and employment conditions**

Fielden et al. (2000) motioned that women in construction had been singled out by their male colleagues and clients for duties in tended to "test" their capability to work in a male-dominated field. Also, Fielden et al. cited that the cost of poor performance for women in construction could be much greater than that of men. They said that gender stereotypes could be reinforced by poor performance. Since top positions are male dominated in this industry, women could not get enough support in this subject. This may cause to an obstacle for promotion in their working career. Cleaveland and Kerst (1993) stated that women are the target of more subtle forms of sexual harassment in masculine occupations such as the construction industry.

Matope (2007) found in the results of the research it was evident that the employers' attitudes towards the employment of female engineers had positively changed in favor of the females as indicated by 62% of the female students and 54% of the lecturers . It appears most employers were giving the same pay for both males and females for the same jobs. However, there was still the need of improving the working environment further to make the work place more comfortable for female employers. This could be done by providing baby seating facilities to working mothers, time allowances to suckling mothers, extension of the maternity leave period and affording females equal promotion prospect as those of males. Nevertheless the provision of these facilities should not compromise productivity.

#### **2.7 Engineering women in developed country**

While women comprise 46% of the total labor force in the U.S., only 12% are employed in the Science and Engineering workforce, according to the U.S. Census Bureau from 1995-2000, in 1983, only 5.8% of the engineers in the U.S. were women. Almost two decades later, in 1999, the percentage of women in the engineering in the U.S. universities had risen to just over 19%, however, engineering womens in the U.S. workforce has only increased to only 10.6% (Galloway, 2006). According to Rhoten and Pfirman (2007) in the USA 20.3 % of not working students enrolled in engineering is female. In the USA Warren (2003) found that the construction industry is the fastest growing industry for women. Although only about 3%of those employed by the construction industry is women.

While statistics were not easily gathered for the overall women in engineering generally in **Japan**, the statistics relative to women in civil engineering per data from JSCE 'Japan Society of Civil Engineers' showed a low percentage of women in engineering. In 2005, of the 39,842 members of JSCE, 1,025 are women, or 2.5%. Of the Regular members, there are 30,761 which only 520 are women. Of Students Membership, there are 5,473 members of which 502 are women. Of Fellow Membership, there are 2,268 fellows of which only 3 are women (Galloway, 2006).

Female entrants to degree courses in engineering in **UK** universities are now 15 percent compared with 7 percent in 1984 (Kirby, 1996). However, only 4.6 percent of working engineers working in industry are women (Carter and Kirkup, 1990), although this percentage is expected to increase to 10-12 percent by the year 2010 (Evetts, 1998). The numerical preponderance of men will continue to be very high and this pattern is repeated in other **European countries** as well as in **North America**. The **UK** is distinct in having the highest rate of part-time work, however, for engineers as well as for other professions. In France, for example, most women in working engineering work full-time and continuously over the life-cycle (Fielding and Glover, 1997), in **US** and according to national science board 2006 science and engineering indicators engineering degrees awarded by gender for the year from 1983 to 2002 show in figure (2.1) and percentage of engineering degrees awarded to women by discipline from 1983 to 2002 as show in figure (2.2)

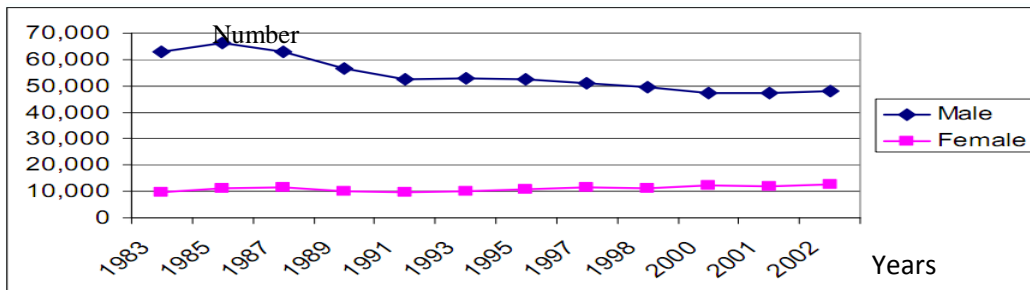


Figure (2.1): Engineering degrees awarded by gender  
Source: National science board 2006 science and engineering indicators

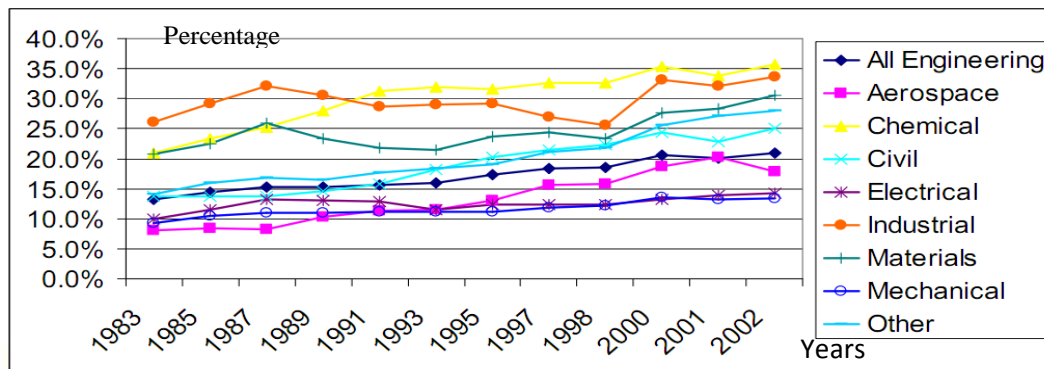


Figure (2.2) Percentage of engineering degrees awarded to women by discipline  
(Source: National science board 2006 science and engineering indicators)

The analysis revealed that three fields, chemical, industrial and material engineering attracted the highest percentage of women. Other fields like electronic engineering, mechanical engineering and Aerospace engineering were not attractive to women at all.

Van Oost (1986) presented data on the distribution of women in engineering fields in **European countries**. Her work confirmed that engineering women students do not participate equally in the different fields of engineering. Data was compiled for **Norway, Portugal, The Netherlands, and Hungary**. From the study, there was a “striking similarity in the pattern of distribution over the fields of engineering”. The participation of women was found to be at equal level with that of men in chemical engineering, and architecture. There was about an equal number of women as men in these two fields while in some countries, women formed the majority. Van Oost (1986) found that mechanical and electrical engineering did not seem to attract girls in any of the countries. She thus recommended special activities in order to recruit girls into mechanical and electrical engineering courses.

Writing earlier, Badekale (2003) cited from Everts and Van Oost (1986) presented the 1982 figures for the **Netherlands** in table (2.1).

**Table (2.1): Female Students in Different Engineering Fields in the Netherlands, 1982**

Field	No.	%
Applied Mathematics	115	10.8
Civil Engineering	47	2.6
Architecture	489	14.8
Electronic Engineering	21	0.7
Mechanical Engineering	26	1.1
Chemical Engineering	121	7.5
Physical Engineering	36	2.5

(Source: Badekale (2003) cited from Everts and Van Oost (1986) p. 306 (from Statistical Year Book of Education, 1984)

The analysis revealed that three fields, applied mathematics, architecture and chemical engineering attracted the highest percentage of women. Other fields like electronic engineering, mechanical engineering and civil engineering were not attractive to women at all, with only one or two percent of the students being female.

According to the National Science Foundation, overall, women have higher college graduation rates compared to men. However, men disproportionately outnumber women in the number of Science and Engineering (STEM) degrees received. Between 1989 and 2008, the approximate percentages of women receiving their Bachelor’s degree in any engineering field were 17% and 19.6%, respectively. The percentage increase in the computer science industry displayed was larger, increasing from approximately 10% in 1989 to 21% in 2008. According to the national society of working engineers in 2004, there were approximately 192,900 female engineers throughout the country, compared with over

1,515,000 men. Of these women, approximately 1/3 of them were software engineers (62,900). Women were also employed in higher rates than men in environmental engineering (9% to 4%) and chemical engineering (7% to 4%). However, they were less likely than men to be employed in mechanical engineering (8% to 17%) and electrical engineering (12% to 18%).

## 2.8 Engineering women in developing country

The percentage of women in engineering profession is low in most of the **Arab World** compared to their counterpart in other parts of the world. There is no accurate updated statistics of the percentage of women neither in technical/engineering profession nor in higher engineering education in most of the Arab universities. Baytiyeh (2012) mentioned that enrolment statistics of women in engineering in some Arab countries are impressive such as in **Bahrain** (32%) and in **Kuwait** (49%), information about the career paths which engineering womens follow from enrolment till practicing the engineering career is not well understood.

For example in **Lebanon** the percentage of engineering women enrolment in engineering program between 15.2 and 18.8 in the years from 2005 -2010, in table 2.2 explain the number of female and male enrolment in engineering program in Lebanon.

**Table (2.2): Enrolment of female/male in the engineering program in Lebanon**

Years	Female	Male	Total	%Female
2009-2010	2087	9356	11443	18.2
2008-2009	1753	8223	9976	17.5
2007-2008	1426	7751	9177	15.5
2006-2007	1230	6873	8103	15.2
2005-2006	1259	6612	7871	16.0

Source: (Women, engineers in the Middle East from enrollment to career: a case study" *American Society for Engineering Education*, Vol. 26 No. 5, PP. 1192- 1199.)

Koushki et al. (1999) found that in his study in **Kuwait** civil engineering was the most common field of specialization among the working engineering women interviewed (42.2% of the total). This was followed by specialization in electrical/computer engineering (14.9%), sciences (6.9%), mechanical engineering (6.3%), and management, economics and business administration (5.2%). The remaining percentages belonged to chemical and petroleum engineering and other fields of specializations.

Nelson (2004) mentioned that women are entering the labour force in increasing numbers. The reasons for the increase relate to higher educational achievements and changing attitudes towards working women. In the recent 2011 World Economic Forum annual gender gap index ranked UAE at 103 of 135 countries, making it the region's best-placed nation. Kuwait was next at 105<sup>th</sup>, followed by Bahrain at 110<sup>th</sup>, Qatar 111<sup>th</sup>, Jordan 117<sup>th</sup>, Lebanon 118<sup>th</sup>, Turkey 121<sup>th</sup>, Egypt 122<sup>th</sup>, Syria 123<sup>th</sup>, Oman 127<sup>ns</sup>, Saudi Arabia 131<sup>th</sup> and Yemen last at 135<sup>th</sup> as show in figure(2.3) (Global Gender Gap, 2012).

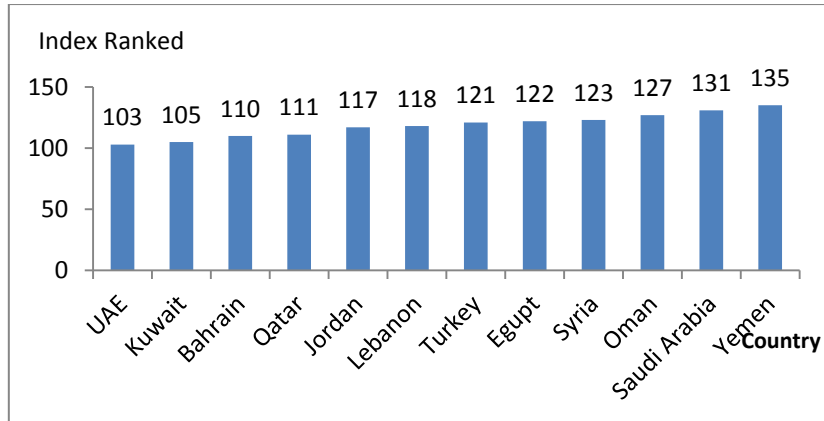


Figure (2.3): Global Gender Gap index ranked, 2012  
 (Source: world economic forum annual gender gap index, 2011)

A leading global management consulting firm Booz and Company (2010) reported that women's participation rate in the workforce in the UAE (59%) is the highest among the other neighboring countries: far ahead of Qatar's 36.4%, Bahrain's 34.3%, and Saudi Arabia's 14.4% as show in figure (2.2) Booz and Company (2010).

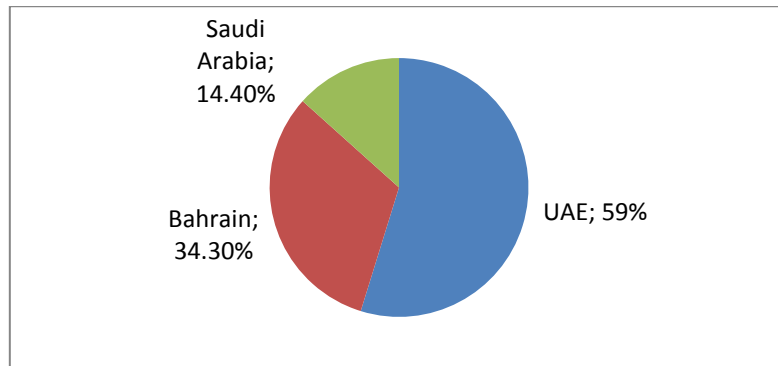


Figure (2.4) Women participation rate in the workforce  
 (Source: Booz and Company, 2010)

Earlier, the UAE 2005 census reported women account for 49.3 percent of the national population; and that their participation in the workforce in the country's business community has grown steadily from 5.2% in 2002 to 7.3% in 2003, 9.1% in 2004, 13.5% in 2005, and 14.7% as of 2006 (Al Gurg, 2006) as show in figure(2.5).

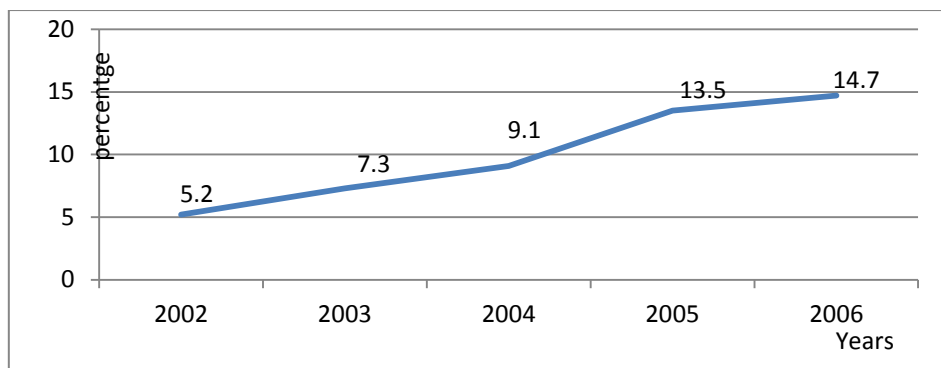


Figure (2.5) Growth women participation in the workforce in UAE  
(Source: Al Gurg, 2006)

Badekale (2003) argue in his study in **Nigeria** that chemical engineering had the highest number of females among the four fields and mechanical engineering consistently had the lowest rate of female participation as only 2.6 percent and 2.0 percent of the students that enrolled in the 1992/93 and 1994/95 sessions, respectively, were female. The reason for this result could be related to a general perception of unflavored fields as a male domain; mechanical engineering has to do with instruments, machines and tools, while on the other hand, the society portrays the woman as soft, gentle and fragile. Thus, the incompatibility between the purported comforts of women as against the ruggedness attributed to men is obvious.

**Table (2.3): Participation rate by sex in different fields (University of Lagos in Nigeria, 1994/95)**

Department	M	F	Total	%F
Electrical Engineering	319	39	358	12.2
Chemical Engineering	210	49	268	22.4
Mechanical Engineering	102	4	196	2.0
Civil Engineering	154	16	170	9.4

## 2.9 Women in Palestinian

Abu Nahleh et al. (2006) cited that Palestinian women are unable to choose any position they would like as they have restrictions imposed on them by their families and society. Hussein (2009) mentioned Palestinian women continue to be some of the most educated women in the Middle East/North Africa (MENA) region. In general according to the *Palestinian Central Bureau of Statistics* "PCBS" (2005) survey women's share in the labor force is very low, despite the slight increase in female participation which occurred between 2000 and 2004: women were 12.7% of the labor force in 2000, and 13.5% in 2004. However, women's participation in the labor force decreased from 13.5% in 2004 to 13.4% in 2005 and 12.7% in first quarter of 2006 (a decrease of 28,000 women). In short, most women are outside the labor force, which means that they are highly dependent on men who are out of work themselves.



Abu Nahleh et al. (2006) motioned that Palestinian women's in low level of formal labor activity is primarily due to structural limitations of the economy rather than to ideological or cultural constraints. Palestinian labor markets are highly gender-segregated, offering women access to a very limited number of sectors. Moreover, these few sectors are in non-growth areas of the economy and are unable to absorb new female labor market entrants. The result is a persistently high rate of female unemployment.

The *Palestinian Central Bureau of Statistics* "PCBS" labor force survey in 2005 shows that women workers are concentrated mainly in the service sector in health care, education, general administration (where 50.3% of the employed women are concentrated). About a third of Palestinian women 32.5% work in the agriculture sector, 8.3% in commerce, 0.6% in transportation, **0.3% in construction**, and 8.1% in manufacturing. As for the distribution of workers among the different economic sectors, findings were that 20.8% of males (compared with 9.3% females) are working in service, including in shops and markets. Some 18.6% of males and 45% of females work as working s and technicians. The percentage of Palestinians working in the public sector went from 22.5% in 2004 to 23.0% in 2005 (PCBS, 2005).

### 2.9.1 Distribution of women over different engineering fields in Gaza Strip

Data in table (2.4) presented the distribution of women in engineering fields in Gaza Strip from engineers association. Data confirmed that architecture engineering attracted the highest percent of women with percent 37.8% followed by computer engineer with percent 27.5%, mechanical engineering consistently had the lowest rate of female participation as only 1.2 percent followed by civil engineer with percent 10.9%. The reason for this result could be related to a general perception of unflavored fields as a male domain; mechanical engineering has to do with instruments, machines and tools, while on the other hand, the society portrays the woman as soft, gentle and fragile. Thus, the incompatibility between the purported comforts of women as against the ruggedness attributed to men is obvious.

**Table (2.4): Number of female and male engineers in different engineering fields in Gaza Strip, 2011 (engineers association, 2011).**

Fields	Female	Male	Total	%Female	%Male
Civil Engineering	351	2860	3211	10.9	89.1
Architecture Engineering	374	615	989	37.8	62.2
Computer Engineering	265	697	962	27.5	72.5
Electrical & Communication Engineering	224	1136	1360	16.5	83.5
Industrial Engineering	57	167	224	25.4	74.6
Mechanical Engineering	9	735	744	1.2	98.8
Environmental Engineering	2	9	11	18.2	81.8
<b>Total</b>	1282	6219	7501	17.1	82.9

## 2.10 Conclusion remarks

It is therefore clear from the literature review, that many studies involving career choices were conducted worldwide like United Kingdom, United States, Nigeria, South Africa and others. Various factors were revealed to be important in making a career decision such as parent effect, masculinity and feminization, culture effect, sex discrimination and harassment, work environment and work hours, preference profession, job opportunities and societal need, impact of prior knowledge of engineering disciplines, high rate in high school, prestige of engineering career, and historical role of women and other factor from literature review show in details in table (2.5).

From literature review the base upon women choice career in engineering and their attitude concerning developing their future career. Also barriers to women entering and working within different engineering discipline review. Popularity of some engineering disciplines as career for women review in literature and the most popular engineering discipline for women is architect engineer and less popular engineering discipline for women is mechanical engineer. And from literature review there is a relationship between culture background and the effect of perceived image of the engineering disciplines on recruiting the women. And comparison between the statues of engineering women in developed, developing and Palestine also review.

There is great emphasis on women education and their participation in degree courses, including engineering related disciplines. However, because local socio-cultural forces do not encourage women to participate in the labour market, their presence in the engineering sector is likely to be limited. Although the involvement of women in the engineering field is growing, women are observed as minority in this field.

Undergoing studies in United Kingdom, United States, Nigeria, South Africa, and other country focus on the importance of increasing the diversity in engineering, and technology related disciplines to attract women to studying this disciplines. It is important to company working in different engineering disciplines and technology, university and all walks of society to know the factor that effect women to choice her career in engineering to encourage and motivate more women to choose a different engineering professions.

Table (2.5): Factors affecting women career choice according to their references

#	Factors	Source																																			
		Sommerville et al. 1993	Dainty et al. 2000	Fielden et al. 2000	Agapiou 2002	Fleming et al. 2005	Lane 1997	Dryburgh, 1999	Layne 2009	Sagebiel 2003	Borchert 2002	Burlin 1976	Otto 2000	Kassim et al. 2011	Badolato 1998	Georgiou, 1999	Cunningham 2001	Furlong 1986	Mau and Bikos 2000	Domenico and Jones (2006)	Arslan and Kivrak 2004	Badekale 2003	Newton 1988	Gale 1994	Greed 2000	Taylor, 2010	Jayne et al.,1999	Lauer 2010	Perreault 1992	Chileshe and Haupt 2010)	Etzkowitz, et al. 1994	Bon and Hughes 1992	Baron and Newman 1990	Ferguson and Sharples 1994)	Fearfull and Kamenou 2006		
1	Engineering is a male-dominated industry with a strong masculine culture.	✓	✓	✓	✓				✓												✓	✓	✓	✓		✓	✓										
2	Image about engineering.			✓						✓											✓			✓		✓											
3	Lack of knowledge and information about industry			✓				✓		✓													✓			✓											
4	Career opportunities available			✓									✓	✓	✓	✓				✓		✓		✓				✓									
5	Ability to hire women			✓																			✓			✓	✓										
6	Parents			✓	✓				✓		✓	✓	✓	✓	✓	✓	✓									✓											
7	Family members				✓																																
8	Exposure to experiences				✓				✓		✓	✓	✓	✓	✓	✓	✓				✓																

**Table (2.5): Factors affecting women career choice according to their references**

#	Factors	Sommerville et al. 1993	Dainty et al. 2000	Fielden et al. 2000	Agapiou 2002	Fleming et al. 2005	Lane 1997	Dryburgh, 1999	Layne 2009	Sagebiel 2003	Borchert 2002	Burlin 1976	Otto 2000	Kassim et al. 2011	Badolato 1998	Georgiou, 1999	Cunningham 2001	Furlong 1986	Mau and Bikos 2000	Domenico and Jones	Arslan and Kivrak 2004	Badekale 2003	Newton 1988	Gale 1994	Greed 2000	Taylor, 2010	Jayne et al.,1999	Lauer 2010	Perreault 1992	Chileshe and Haupt 2010)	Etzkowitz, et al. 1994	Bon and Hughes 1992	Baron and Newman 1990	Ferguson and Sharples	Fearfull and Kamenou 2006							
9	Recognition of their own aptitudes and preferences				✓															✓	✓	✓	✓	✓																		
10	Exposure to role models.				✓							✓			✓					✓						✓																
11	Enjoyment of mathematics and science					✓			✓		✓						✓					✓		✓																		
12	Financial concerns were primary motivational factors in their pursuit of an engineering education					✓						✓		✓			✓			✓							✓															
13	Career guidance						✓							✓							✓							✓														
14	Culture	✓	✓	✓	✓			✓							✓								✓			✓																
15	Greatest degree of vertical segregation					✓					✓								✓							✓																
16	Self confidence										✓	✓											✓			✓		✓														

**Table (2.5): Factors affecting women career choice according to their references**

#	Factors	Sommerville et al.	Dainty et al. 2000	Fielden et al. 2000	Agapiou 2002	Fleming et al. 2005	Lane 1997	Dryburgh, 1999	Layne 2009	Sagebiel 2003	Borchert 2002	Burlin 1976	Otto 2000	Kassim et al. 2011	Badolato 1998	Georgiou, 1999	Cunningham 2001	Furlong 1986	Mau and Bikos 2000	Domenico and Jones	Arsian and Kivrak	Badekale 2003	Newton 1988	Gale 1994	Greed 2000	Taylor, 2010	Jayne et al.,1999	Lauer 2010	Perreault 1992	Chileshe and Haupt 2010	Etzkowitz, et al.	Bon and Hughes	Baron and Newman	Ferguson and Sharples	Fearfull and Kamenou		
17	Parent education level		✓		✓						✓	✓	✓						✓										✓								
18	Mother's occupation											✓								✓																	
19	Work on family work																✓				✓								✓								
20	Men do not know how to treat women					✓					✓			✓			✓								✓			✓							✓	✓	
21	Working hours.																				✓							✓			✓						
22	Sex Discrimination and Harassment on Site			✓											✓			✓			✓							✓	✓							✓	
23	Achieve high-status positions or to move into management								✓				✓	✓														✓									
24	The Working Environment				✓					✓												✓							✓								
25	Financial discrimination																																	✓			
26	Family responsibility											✓														✓									✓	✓	

## CHAPTER 3

### RESEARCH METHODOLOGY

#### 3.1 Introduction

This chapter discusses research procedure and the method that used in this research. The adopted methodology to accomplish this study uses the following techniques: review of literature related to the factor affecting women career choice in the construction industry and other engineering disciplines were studied, questionnaire for gathering data, data analysis, interview with experts. The data gathered from the questionnaires were analyzed using the Statistical Package for Social Sciences (SPSS 18). The results of the data analysis are presented. The data were collected and then processed.

Kallet (2004) explained that, the methods section should describe what was done to answer the research objectives, describe how it was done and explain how the results were analyzed. This chapter provides the information about the research strategy and design, research population and sample, questionnaire design, process of data collection, and statistical data analysis. Content validity and pilot study are also summarized.

#### 3.2 Research design

The term "research design" refers to the plan or organization of scientific investigation, designing of a research study involves the development of a plan or strategy that will guide the collection and analyses of data (Polit & Hungler, 1999). Burns & Grove (1997) defined the term design as "some consider research design to be the entire strategy for the study, from identifying the problem to find the plans for data collection.

This research consists of seven phases;

1. Proposal for identifying and defining the problems and establishment of the objectives of the study and development of research plan.
2. Literature review: literatures of the career decision- making, female engineering and engineering jobs, underrepresented women in different engineering discipline, factors affecting women career choose in construction industry and other engineering disciplines, engineering women in developed country, engineering women in developing country, women in Palestine, and literatures cover each objective, figure (3.1) illustrates research methodology.
3. Field survey.
4. Design the questionnaire, through distributing the questionnaire to pilot study, where students, expert's women in construction and other engineering fields, contractor and employer were contacted. The purpose of the pilot study was to prove that the questionnaire questions are clear to be answered in a way that help to achieve the objectives of the study. The questionnaire was modified based on the results of the pilot study.
5. Questionnaire distribution. The questionnaire was used to collect the required data in order to achieve the research objective.

6. Data analysis and discussion. The Statistical Package for the Social Sciences was used to perform the required analysis.
7. The conclusions and recommendations, show in figure (3.1) illustrates the methodology flow chart

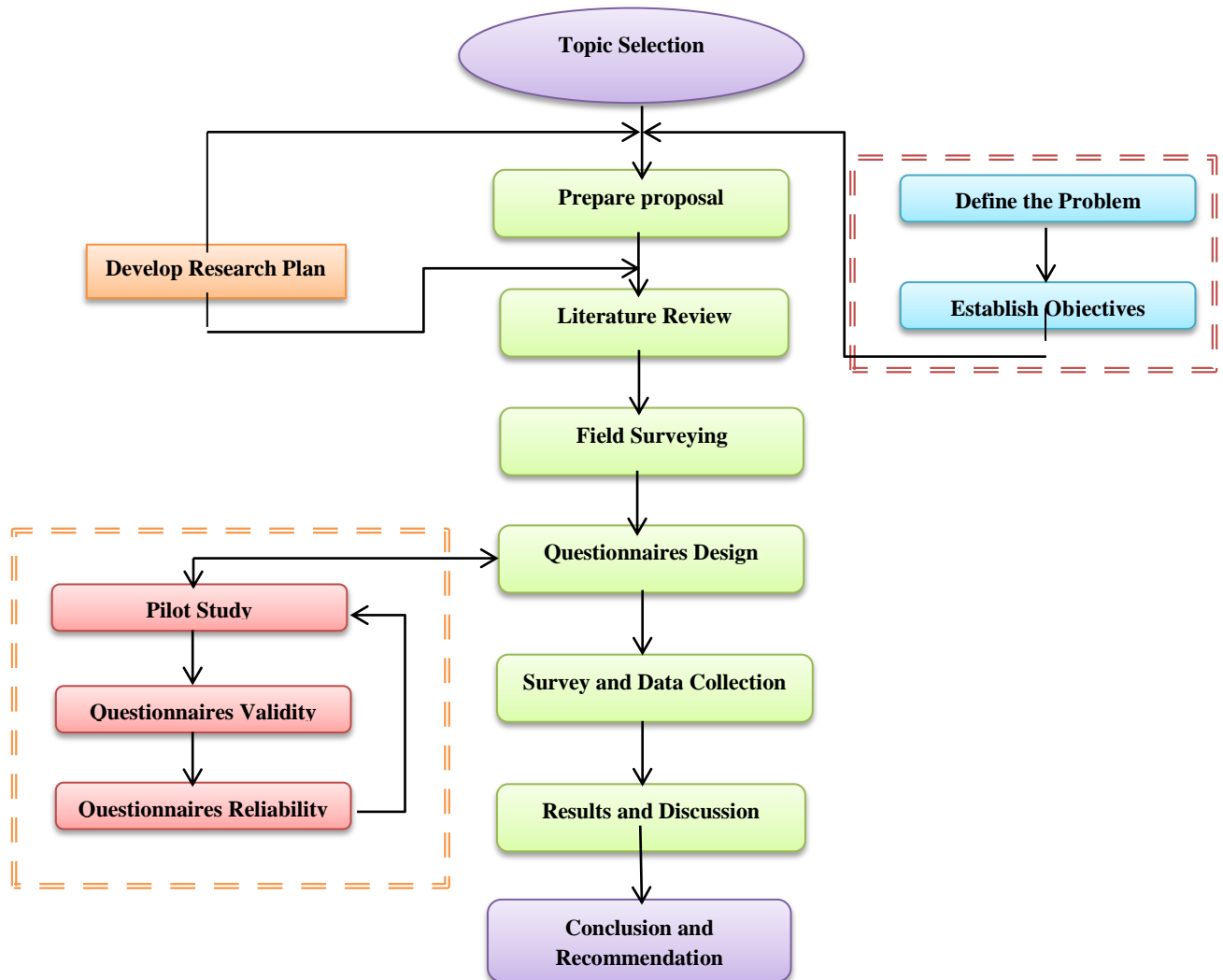


Figure (3.1) Methodology flow chart.

### 3.3 Research purpose

#### This study aims to:

- Identify factors that effect on women in choosing their career in Gaza Strip by discussing the problems facing them as they contemplate careers in the construction industry and other engineering disciplines.
- The study seeks to investigate the perceived image of the construction industry and other engineering disciplines and whether this perception is influenced by the expectations of women before entering engineering faculty.
- It investigates whether there is a relationship between the perceived image of, and recruitment to engineering discipline by sex.
- An investigation the levels of knowledge of the construction industry and other engineering disciplines forms part of this study.

- Investigate the effect of family parents on women in choosing their career.
- The relationship between the cultural of women and their career choice preference within the engineering disciplines is also examined, and investigated the effect of high rate in high school when women choosing her career.

### 3.4 Data collection

The questionnaire was chosen to be the method of collecting data in this research, since the questionnaire is probably the most widely used data collection technique for conducting surveys. Questionnaires have been widely used for descriptive and analytical surveys in order to find out the facts, opinions and views (Naoum, 2007). It enhances confidentiality, supports internal and external validity, facilitates analysis, and saves resources. Data are collected in a standardized form from samples of population. The standardized form allows the researcher to carry out statistical inferences on the data, often with the help of computers. The used questionnaire has some limitations such as: it must contain simple questions, no control over respondents and respondents may answer generally (Naoum 2007).

In order to collect the needed data for this research, distribute questionnaires on study population in order to get their opinions about the factors affecting women career choice: comparison between construction engineering and other engineering disciplines. Research methodology depends on the analysis of data on the uses of analytical methods which depends on the poll and use the main program (SPSS 18).

### 3.5 Research population and sample size

Four populations were targeted in this research:

1. Female students in different engineering disciplines from different studying levels
2. Employment engineering women who are working in different engineering disciplines.
3. Unemployment engineering women.
4. Engineering companies that working in different engineering disciplines in Gaza Strip.

This population was choosing to cover this research from all points of view.

Sampling defines the process of making the selections; sample defines the selected items (Burns & Grove, 1987). Wood and Haber (1998) defined the sampling as the process of selecting representative units of a population for the study in a research investigation. While Naoum (2007) defined the term 'sample' a specimen or part of a whole (population) which is drawn to show what the rest is like. Scientists derive knowledge from samples; many problems in scientific research cannot be solved without employing sampling procedures (Wood & Haber, 1998). Unfortunately, without a survey of the population, the representativeness of any sample is uncertain, but statistical theory can be used to indicate representativeness (Fellows & Liu, 2008).

To determine the sample size for each population: Wood and Haber (1998) defined the sampling as the process of selecting representative units of a population for the study in research investigation. A sample is a small proportion of a population selected for observation and analysis.



The samples were selected randomly from female students, working engineering women, unemployment engineering women, engineering company.

Equation 3.1 was used to determine the sample size of the unlimited population

$$SS = \frac{Z^2 * P * (1-P)}{C^2} \quad \text{Equation 3.1}$$

Where SS = Sample size

Z = Z value ( e.g. 1.96 for 95% confidence level)

P = percentage picking a choice, expressed as a decimal (0.50 used for sample size needed).

C = margin of error (7%)

$$SS = \frac{1.96^2 * 0.5 * (1-0.5)}{0.07^2} = 196 \text{ working, not working and students engineering women}$$

Correction for Finite Population

$$SS_{\text{new}} = \frac{SS}{1 + \frac{SS-1}{POP}} \quad \text{Equation 3.1}$$

Where pop is the population

In Gaza strip 1200 engineering women belong to engineers Association (engineers Association, 2012) and about 700 female engineering students in Islamic university in Gaza strip in different engineering disciplines (Islamic university, 2012).

$$SS_{\text{new}} = \frac{196}{1 + \frac{196-1}{1700}} = 175$$

The total number distributed to working, unemployment engineering women and female students engineer were 200 questionnaires to overcome the risk of not responding from the respondents and to reflect higher reliability and benefits for the study.

The total number returned was 175 questionnaires.

For engineering companies sample size calculation was done in the same way, where sample size is 50 companies, the total number distributed to engineering company was 70 questionnaires to overcome the risk of not responding from the respondents and to reflect higher reliability and benefits for the study.

The total number returned was 50 questionnaires. The details are shown in Table (3.1).

**Table (3.1): Sample characteristic**

Frequency		Percentages
<b>1. Engineering women state</b>		
Employment engineering women	110	62.9
Unemployment engineering women	19	10.9
Students	46	26.3
<b>Total</b>	<b>175</b>	<b>100</b>
<b>Engineering company</b>		
	50	100
<b>2. Working sector for working engineering women</b>		
Governmental organization	54	49.1
Private organization	34	30.9
Civil	14	12.7
International organization	8	7.3
<b>Total</b>	<b>110</b>	<b>100</b>
<b>3. Experience of working engineering women</b>		
Less than 5 years	53	48.2
(5-10) years	39	35.5
(11-15) years	13	11.8
More than 15 years	5	4.5
<b>Total</b>	<b>110</b>	<b>100.00</b>
<b>4. Discipline of sample</b>		
Civil	39	22.3
Architect	35	20.0
Communication	29	16.6
Computer	65	37.1
Industry	7	4
<b>Total</b>	<b>175</b>	<b>100.0</b>

### 3.5.1 Questionnaire distribution

Questionnaires were distributed in two ways:

1. Electronic way via email for all engineering women registering in engineering association and also published the questioner on the Facebook page of engineering association, but the number of sample was received is very low it is only 18 questioner by electronic way.
2. Hand-delivered and responded to in the presence of the researcher. It is very difficult way and need more and more of time and work and this option might be time consuming but yielded a high response rate and the sample was received is about 175 questioners from working, nit working engineering women and female students engineer and 50 questioners from engineering company.

### 3.5.2 Sample characteristic

In order to achieve the objectives of this study the views of two categories of questioner were distributed:

1. First category random sample were selected 200 questioner were distributed to the population female engineers students , working engineering women and not working engineering women, only 175 questionnaires were received, and table (3.1) illustrated the characteristic of sample.
2. Second category random sample were selected 70 questioner were distributed to the population of "engineering company that are working in different engineering discipline" only 50 questioners are received.

### 3.6 Questionnaire design

The good design of the questionnaire is a key to obtain good survey results and warranting a high rate of return (Chan and Chan 2002). The questionnaire survey was conducted to determine the opinion of engineering women in the factor that effect on them when they choosing the engineer as career. Nine pages questionnaire accompanied with a covering letter were delivered to 200 engineering women and 2 pages questionnaire accompanied with a covering letter were delivered to 70 engineering company. The letter was explaining the purpose of the study, the way of responding, the aim of the research and the security of the information in order to encourage a high response. The questionnaire included multiple choice questions: which used widely in the questionnaire, the variety in these questions aims first to meet the research objectives, and to collect all the necessary data that can support the discussion, results and recommendations in the research.

The sections in the questionnaire will verify the objectives in this research related to the factors affecting women career choice and divided into two sections to accomplish the aim which was put for:

Section (1): General information.

Section (2): Factors affecting women career choice. Which are follows likert scale as the following in table (3.2):

Table (3.2) likert scale

Level	Strongly agreed	Agreed	Neutral	Disagreed	Strongly disagreed
Scale	5	4	3	2	1

The questions of the research questionnaire are constructed based on:

- Literature review.
- Pilot Study.
- The experience of the researcher in different engineering discipline in Gaza Strip.

According to literature related to the research topic that will include a survey of previous studies in the field to achieve the objectives of the study were reviewed. And after many stages of brain storming, consulting, amending, and reviewing, a questionnaire was develop that carried out using self-administered questionnaires and interviews with selected samples of women currently working in or studying towards future employment as engineering. The quantitative research consist of a questionnaire developed from the literature review the questions were mostly closed and involved yes/no questions, ticking boxes on a table, some more open ended questions were included to address how women were influenced to study a career in different engineering disciplines as well as the content analysis of the interviews with pilot.

#### Two categories of questionnaire were designed:

- **Category one** design for Students in different engineering disciplines from different studying level, working engineering women who working in different engineering disciplines and engineering women not working and not work, nine page questionnaires accompanied by a covering letter. The letter indicated the objectives of the research and explained to the participants that the results of the questionnaire would be used to determine the factor affecting women career choice.

The questionnaire comprised of two sections to accomplish the aim of this research, as follows:

- 1) **Section one:** General information about engineering women, information like state of engineer "women students engineer, not working engineering women, working engineering women ", working sector, discipline "Civil, Architect, Computer, Communication, Industry", experience.
  - 2) **Section two:** factors affecting women career choice. This section aimed to achieve the research objectives that intend to identify the most common factors that affecting women career choice in Gaza Strip.
- **Category two** design for organization that working field is in engineering discipline, three page questionnaire accompanied by a covering letter. The letter indicated the objectives of the research and explained to the participants that the results of the questionnaire would be used to determine the factor affecting women career choice.
- The questionnaire comprised of two sections to accomplish the aim of this research, as follows:
- 1) **Section One:** General information about organization.
  - 2) **Section Two:** This section aimed investigate employers' attitudes and employment conditions to achieve the research objectives that intend to identify the most common factors that affecting women career choice in Gaza Strip from the point of view employer and managers.

The value of the questionnaire is that since it contains mostly close-ended questions, it will be reasonably easy to complete. The questionnaire does not entail much data collection from respondents (Fellows and Liu, 2008).

The objective of the questions was to find out what the participants knew, did, felt and thought cultural impact on career choices in engineering by women. For these specific study two types of questions where used in the questionnaire survey:

#### 1. Open ended questions

When respondents have and take the time to reflect on answers to questions, this provides the opportunity to get more meaningful information than from closed questions. This also assists in receiving responses that provide a clear indication of what the respondent feels about the topic. Open-ended questions provide a wealth of information provided respondents feel comfortable about expressing their opinions; provide the respondents an opportunity to express themselves freely resulting in a greater variety of information; virtually eliminate the possibility of the investigator's bias (Kumar, 2005). The questionnaire had five (5) open ended questions, the questions helped the researcher gain better understanding and able to better interpret and analysis some of the answers for the closed ended questions like What is the look of your family and your community for women who work in workplaces dominated by men?

#### 2. Closed questions

Closed-ended questions, as they provide 'ready-made' categories within which respondents reply to the questions asked by the researcher, help to ensure that the information needed by the researcher is obtained (Kumar, 2005).The respondents were given a set of alternative choices from which they could choose to answer the question such as, for example, "yes," "no," multiple choice, a rating or a ranking. Closed questions can usually be answered quickly, allowing researchers together large amounts of information quickly. However, the disadvantage is that

respondents may rush through the questions and not take enough time to think about their answers. This type of questioning was regarded as beneficial to this topic as the questions and answers provided were instrumental in identifying and providing input related to the hypothesis presented. The questionnaire consisted of a total of hundred and twenty five (125) closed ended questions like "any area of discipline of engineering found that more attractive to the women" and multiple of choice are civil, architect communication, computer, industry.

A draft questionnaire was discussed with the supervisor who requested adding more factors and to test validity content by the knowledge of experts. Content validity test was conducted by sending the draft questionnaire with covering letter to ten experts. The ten experts are two lectures in the Islamic University; eight engineering women each with minimum experience of 5 years working as engineer. The experts are requested to evaluate the content validity of questionnaire, to check readability, offensiveness of the language and to delete or add more factors and information if needed as show in table (3.3)

In general, the experts agreed that the questionnaire is suitable to achieve the goals of the study. Table 3.3 shows the comments and some modifications have been done.

As shown in Table 3.3, some factors were added, slightly changed and deleted. The following is a discussion of the experts' remarks for each factor:

1. Factors related to parents: four factors were selected, two were added one by researcher's experience "my friends have significant effect in the choice of specialization in engineering" and another by expertise in piloting study "one of my family member has a significant effect in the choice of specialization in engineering".
2. Factors related to masculinity and feminization of engineering: one factor was modified by researcher experience. Five factors were added three factors from their were added by researcher experience "preference for men over women when hiring affect the choice of profession in engineering", "difficult to get women to the supervisory position affect the choice of profession in engineering", "low number of women in engineering contributes to the shortage of skills in the profession". Two factors were added by piloting "male dominance on the senior administrative positions affects women's choice of profession in engineering", "increase the number of women in engineering contributes in improving the performance of work".
3. Factors related to the culture effect: one factor was selected, four factor were modified "customs and tradition play a major role in the decision to specialize in engineering", "the historical role played by women and men in society make men less receptive to their women colleagues", "the historical role played by women and men in society make men less receptive to their women colleagues", "society's perception of women throughout the wife only makes it less likely for the selection of the engineering profession", "from my experience, i think that the traditional role of women as wives and mother affect the accepted work in the field" and five factor were added "women wish to have a large number of children are more attracted to other sectors of the engineering", "religiosity women play a key role in the decision-making for women's working", "customs and traditions in a community affect my actions in the field of employment", "the small number of working women in our

society has led to fewer and inefficient kindergarten "nursery", "there are those who believe in the proverb (we appreciate women but do not give them a place)".

4. Factors related to sex discrimination and harassment on site: six factors were modified " discrimination reflect negative image when women choice her career", "engineering women subjected to harassment in the workplace", working women in the field of engineering does not have the opportunity to develop the same as her male colleagues", "women in the workplace are respected as a man", "women fit administrative work more than work at the sites", "engineers subjected to verbal flirting and harassment at work" and seven factor were added " estimated women majoring in engineering", " man has experienced more than women in engineering fields", "the women can do everything as well as men", " pregnant engineering womens who work in the workplace discrimination suffered the highest percentage compared to other employment sectors", " i have discriminated in my work because i am women", " prevail engineered the idea that leaving them to work in the field of engineering, it will eliminate the male unemployment", " the desire to raise the standard of living for my family a major reason for my departure to work".
5. Factors related to work environment and work hours: ten factors were modified "some things are related to the nature of women not suitable for work in the field of engineering", " inadequate service facilities such as toilets, ablution and place of prayer", " the nature of the work in engineering fields promotes the presence of women", " women less receptive to work in an unsafe environment than men.", "chance of women to get supervisory position in the workplace is unfair.", " long working hours effect on women to the choice profession in engineering.", " evening work is not appropriate for women", " irregular working hours is not appropriate for women", " irregular working days is not appropriate for women ", "limited number of leave days affect the choice of engineering as a profession for women" and three factor were added " some materials and tools used in eengineering make a problem for women.", " women are less likely to work in high temperatures weather.", " travels between work sites are not suitable for women."
6. Factors related to intellectual and physical capability: two factors were added "women over fourteen years old are not appropriate for work in your field as men in the same age", "women take more vacation than men" and one factor was modified "women physically unsuited to allocate engineering as men " .
7. Factors related to family responsibility: three factors were modified "women with young children cannot work at the site ", " vacations abound with a married woman and have young children ", " a low concentration of women and their productivity at work when they are married and have children" and two factors were added "lack of facilities equipped to care for children in our society affect women to choose engineering profession.", " high prices facilities special for children affect women to choose engineering profession " .
8. Factors related to preference profession: two factors were modified " women prefer jobs in sectors such as teaching, trade more than engineering specialty", "accounting, legal or doctor more attractive and popular for women of being an engineer" and one factor was added "I would encourage other women to choose working sectors other than engineering".

9. Factors related to job opportunities and societal need: two factors were added "men's preference than women to work effect on the selection of the engineering profession", "few women find a good jobs" and two factors were modified "provide job opportunities in the field of engineering impact on the selected engineering discipline", "lack of job opportunities in the future leads me to study another profession".
10. Factors related to the impact of prior knowledge of engineering disciplines: four factors were selected.
11. Factors related to obtain high rate in high school: one factor was added "confined my optional for the engineering profession on obtain high average in high school".
12. Factors related to prestige of engineering career: two factors were added "social level of engineering leads me to choice this profession", "my dream to be engineering leads me to choice this profession" and one factors was added "prestige of engineering career leads me to choice this profession".
13. Factors related to cost of course: three factors were added "financially level of my family leads me to study engineering ", "provide grants and university loans impact on my choice of engineering.", "the high cost of engineering study impact on my decision to choice engineering".
14. Factors related to the historical role of women: three factors were modified "women can build a successful career in engineering.", "women's have active role in the engineering work", " a man more suited than women's for disciplines of engineering ".
15. Factors related to the financial discrimination: two factors was selected and two factors were modified "do you take the same salary value?", "do you get the same chance as men engineer when you get promotion".

The final version of the questionnaire was designed in English language, while the distributed version was in Arabic language, since the Arabic language is much effective and easier to be understood to get more realistic results.

**Table (3.3) List of factors affecting women career choice**

Factor and its source	Source	Comment	Final name used
<b>1. Factors related to parents</b>			
my parents have a significant effect in the choice of specialization in engineering Borchert(2002), kassim et.al(2011), badolato(1998), Georgiou(1999), furlong (1986), fielden et. al(2000)	Literature	Selected	
	Researchers experience	Added	my friends have significant effect in the choice of specialization in engineering
	Pilot	Added	One of my family member has a significant effect in the choice of specialization in engineering
The profession of my parents have a significant impact on the choice of specialization in engineering Burline(1976), Borchert(2002), Domenico & Jones(2006)	Literature	Selected	
Level of education of my parents has a significant effect in the choice of specialization in engineering Burline(1976), Borchert(2002), otto (2000), Mau & Bikos(2000)	Literature	Selected	
I studied engineering in order to work in the field of family business Arslan & Kivrak(2004)	Literature	Selected	
<b>2. Factors related to masculinity and feminization of engineering</b>			
Construction industry has male-dominated nature. Gale(1994), Agapiou (2002), fielden et. al(2000)	Researchers experience	Modified	Male dominance on some engineering disciplines prevents women from choosing engineering.
	pilot	Added	Male dominance on the senior administrative positions affects women's choice of profession in engineering.
	Researchers experience	Added	Preference for men over women when hiring affect the choice of profession in engineering.
	Researchers experience	Added	Difficult to get women to the supervisory position affect the choice of profession in engineering.
	pilot	Added	Increase the number of women in engineering contributes in improving the performance of work.
	Researchers experience	Added	Low number of women in engineering contributes to the shortage of skill in the profession.
<b>3. Factors related to the culture effect</b>			
Culture has a major influence on why women have chosen or been restricted from choosing different discipline engineering. Taylor(2010)	Pilot	Modified	Customs and tradition play a major role in the decision to specialize in engineering.
Most men do not know how to treat women in construction and they were frequently embarrassed. Greed (2000), Jayne et al.(1999), Fielden et al. (2000)	Pilot	Modified	The historical role played by women and men in society make men less receptive to their women colleagues.
	Pilot	Added	Women wish to have a large number of children are more attracted to other sectors of the engineering
Women who seek entry into male-dominated cultures either have to act like men in order to be successful. Jayne et al (1999), Gale (1994)	Researchers experience	Modified	Society's perception of women throughout the wife only makes it less likely for the selection of the engineering profession.
	Pilot	Added	Religiosity women play a key role in the decision-making for women's working .
The construction industry culture: crisis, conflict and masculine. Gale (1994)	Researchers experience	Modified	From my experience, I think that the traditional role of women as wives and mother affect the accepted work in the field.



**Table (3.3) List of factors affecting women career choice**

Factor and its source	Source	Comment	Final name used
	Researchers experience	Added	Customs and traditions in a community affect my actions in the field of employment.
Inability to balance between the demands of work and family is a major cause in the reluctance of many women engineering work. Hill (2010), (Frehill et al., 2009). Fearfull and Kamenou (2006), Ferguson and Sharples (1994)	Literature	Selected	
	Pilot	Added	The small number of working women in our society has led to fewer and inefficient kindergarten "nursery".
	Pilot	Added	There are those who believe in the proverb (We appreciate women but do not give them a place).
<b>4. Factors related to sex discrimination and harassment on site</b>			
There is discrimination in the sense that women are often barred or discouraged from entering certain occupations. Lauer (2010)	Researchers experience	Modified	Discrimination reflect negative image when women choice her career.
Women must learn how to effectively address and cope with aggression, foul language, sexual harassment, intimidation and rejection in the construction industry. Perreault (1992)	Researchers experience	Modified	Engineering women subjected to harassment in the workplace
	Researchers experience	Added	Estimated women majoring in engineering.
Women are less likely than men to achieve high-status positions or to move into management. Lauer (2010)	Pilot	Modified	Working women in the field of engineering does not have the opportunity to develop the same as her male colleagues.
Women are not taken seriously by subordinate men, particularly older or hold university degrees men are often ridiculed. Perreault (1992)	Researchers experience	Modified	Women in the workplace are respected as a man.
	Researchers experience	Added	Man has experienced more than women in engineering fields.
Female civil engineers stated that they prefer to work in technical office rather than construction sites. Arslan and Kivrak (2004)	Researchers experience	Modified	Women fit administrative work more than work at the sites.
	Researchers experience	Added	The women can do everything as well as men.
	Pilot	Added	Pregnant engineering womens who work in the workplace discrimination suffered the highest percentage compared to other employment sectors
	Researchers experience	Added	I have discriminated in my work because I am women.
Women must learn how to effectively address and cope with aggression, foul language, sexual harassment, intimidation and rejection in the construction industry. Perreault (1992)	Pilot	Modified	Engineers subjected to verbal flirting and harassment at work.
	Pilot	Added	Prevail engineered the idea that leaving them to work in the field of engineering, it will eliminate the male unemployment.
	Pilot	Added	The desire to raise the standard of living for my family a major reason for my departure to work
<b>5. Factors related to work environment and work hours</b>			

**Table (3.3) List of factors affecting women career choice**

Factor and its source	Source	Comment	Final name used
Trades women are more likely than their male counterparts to die in job-related. ( <i>Kumbhar, 2011</i> ).	Researchers experience	Modified	Some things are related to the nature of women not suitable for work in the field of engineering.
	Researchers experience	Added	Some materials and tools used in engineering make a problem for women
women choose a career in the construction industry if the work environment provides good working conditions War (2003)	pilot	Modified	Inadequate service facilities such as toilets, ablution and place of Prayer
Construction is a dangerous industry ( <i>Kumbhar, 2011</i> ).	Pilot	Modified	The nature of the work in engineering fields promotes the presence of women.
Safety and health problems in construction create barriers to women entering and remaining in this field. Chileshe Haupt (2010)	Researchers experience	Modified	Women less receptive to work in an unsafe environment than men.
Women are less likely than men to achieve high-status positions or to move into management. Lauer (2010)	pilot	Modified	Chance of women to get supervisory position in the workplace is unfair.
	Researchers experience	Added	Women are less likely to work in high temperatures weather.
	Researchers experience	Added	Travels between work sites are not suitable for women.
Female construction workers are long hours away from their home. <i>Kumbhar (2011)</i>	Researchers experience	Modified	Long working hours effect on women to the choice profession in engineering.
Women do not want to stay overnight at sites and do not work nightshifts and weekends. Arslan and Kivrak (2004)	Researchers experience	Modified	Evening work is not appropriate for women
There is no fix timing of working hours <i>Kumbhar (2011)</i>	Researchers experience	Modified	Irregular working hours is not appropriate for women
The nature of employment in construction activity is seasonal and uncertain. <i>Kumbhar (2011)</i>	Researchers experience	Modified	Irregular working days is not appropriate for women
Women do not want to stay overnight at sites and do not work nightshifts and weekends. Arslan and Kivrak (2004)	pilot	Modified	Limited number of leave days affect the choice of engineering as a profession for women
<b>6. Factors related to intellectual and physical capability</b>			
	pilot	Added	Women over fourteen years old are not appropriate for work in your field as men in the same age.
the lecturers strongly agreed that female engineering students could not cope physically as boys with the man tasks which engineering at times called for. Matope (2007), (Clarke et al., 2005), Aulin and Jingmond (2011)	pilot	Modified	Women physically unsuited to allocate engineering as men.
	pilot	Added	Women take more vacation than men.
<b>7. Factors related to family responsibility.</b>			

**Table (3.3) List of factors affecting women career choice**

Factor and its source	Source	Comment	Final name used
Outside forces such as the need to take care of themselves and their children are very important to women. Fearfull and Kamenou (2006)	Pilot	Modified	Women with young children cannot work at the site.
Women often make their 'choices' with their family circumstances and responsibilities in mind. Fearfull and Kamenou (2006)	pilot	Modified	Vacations abound with a married woman and have young children.
Women often make their 'choices' with their family circumstances and responsibilities in mind. Fearfull and Kamenou (2006)	Pilot	Modified	A low concentration of women and their productivity at work when they are married and have children.
	Pilot	Added	Lack of facilities equipped to care for children in our society affect women to choose engineering profession.
	pilot	Added	High prices facilities special for children affect women to choose engineering profession.
Balancing job and family responsibilities proved the most important criteria and consideration when attracting women to the profession. Ferguson and Sharples (1994)	Pilot	Modified	Women working in engineering adversely affect family stability.
<b>8. Factors related to preference profession</b>			
Women being employed in traditional careers like teaching and nursing. Madikizela and Haupt (2010) Chovwen (2003), Ososki et al. (2006)	Researchers experience	Modified	Women prefer jobs in sectors such as teaching, trade more than engineering specialty.
Traditionally female careers and work such as nursing, teaching, social work, sales, care taking, and administrative support positions. Chovwen (2003)	Researchers experience	Modified	accounting, legal or doctor more attractive and popular for women of be an engineer
	Researchers experience	Added	I would encourage other women to choose working sectors other than engineering.
<b>9. Factors related to job opportunities and societal need.</b>			
Career opportunities, meaning demand for such careers attracted students to the field. Azizzadeh et al. (2003), Jones and Larke (2005), Ososki et al. (2006)	Pilot	Modified	Provide job opportunities in the field of engineering impact on the selected engineering discipline.
Career opportunities, meaning demand for such careers attracted students to the field. Azizzadeh et al. (2003), Jones and Larke (2005), Ososki et al. (2006)	Pilot	Modified	Lack of job opportunities in the future leads me to study another profession.
	Researchers experience	Added	Men's preference than women to work effect on the selection of the engineering profession.
	Researchers experience	Added	Few women find a good jobs
<b>10. Factors related to the impact of prior knowledge of engineering disciplines</b>			
Women familiar with the opportunities available for the job in engineering disciplines. Madikizela(2008),	Literature	Selected	
Women expect to have a successful career in engineering because they have enough Knowledge for this specialization. Madikizela(2008),	Literature	Selected	
There is a need for engineering disciplines to provide more knowledge about the opportunity to employ women. Madikizela(2008),	Literature	Selected	
Equality between men and women in obtaining and function increases the popularity of specialty engineering. Madikizela(2008)	Literature	Selected	

**Table (3.3) List of factors affecting women career choice**

Factor and its source	Source	Comment	Final name used
<b>11. Factors related to obtain high rate in high school</b>			
	Researchers experience	Added	Confined my optional for the engineering profession on obtain high average in high school.
<b>12. Factors related to prestige of engineering career</b>			
	Researchers experience	Added	Social level of engineering leads me to choice this profession.
Personal factors such as prestige, personality type and lifestyle preference played an important role in future career choices. Cutler et al. (2006), Singaravelu et al. (2005), Wilkinson (1996)	Researchers experience	Modified	Prestige of engineering career leads me to choice this profession.
	Pilot	Added	My dream to be engineering leads me to choice this profession.
<b>13. Factors related to cost of course</b>			
	Pilot	Added	Financially level of my family leads me to study engineering.
	Pilot	Added	Provide grants and university loans impact on my choice of Engineering.
	Pilot	Added	The high cost of engineering study impact on my decision to choice Engineering.
<b>14. Factors related to the historical role of women</b>			
Women who seek entry into male-dominated cultures either have to act like men in order to be successful. (Jayne et al.,1999)	Researchers experience	Modified	Women can build a successful career in engineering.
This would ultimately lead to an improvement in the available engineering technology. Matope (2007)	Researchers experience	Modified	Women's have active role in the engineering work.
In some societies girls are limited to certain roles, while boys have almost unlimited roles. Cunningham (2001)	Researchers experience	Modified	A man more suited than women's for disciplines of engineering.
<b>15. Factors related to the financial discrimination</b>			
In construction sector, females are paid less than male. <i>Kumbhar</i> (2011), Geertsema (2007)	Researchers experience	Modified	Do you take the same salary value?
Since top positions are male dominated in this industry, women could not get enough support in this subject. This n cause to an obstacle for promotion in their working career. Fielden et al. (2000)	Researchers experience	Modified	Do you get the same chance as men engineer when you get promotion.
Do you have the same chance as men engineer when you take high administrative position? <i>Kumbhar</i> (2011),	Literature	Selected	
Do you get the same incentive as men engineer? <i>Kumbhar</i> (2011),	Literature	Selected	

### 3.7 Pilot study

A pilot study was conducted before collecting the results of the sample. It provides a trial run for the questionnaire, which involves testing the wordings of question, identifying ambiguous questions, testing the techniques that used to collect data, and measuring the effectiveness of standard invitation to respondents (Naoum, 2007). All questionnaires should initially be piloted; completed by small sample of respondents (Fellows and Liu, 2008). The piloting process was briefed about the questionnaire contents, inclusion of the data and the objectives of conducting this study.

1. After modifying the questionnaire according to the notes of the supervisor and before collecting the final data from the whole sample, a pilot study is accomplished and ten copies of questionnaire were distributed for piloting. The process generated some questions about explanation of certain terms and requested to modify some wording of the questionnaire. At the end of this process, some minor changes like merge two version questionnaires one for female students and one for working and not working engineering women. New version of questionnaire become included 87 factor distributed to fourteen groups related to and pilot suggested that using factor analysis in this research. All change and modification was made as show in table (3.3).

### 3.8 Validity of the research

The validity defined as a determination of the extent to which the instrument actually reflects the abstract construct being examined (Burns and Grove, 1993). Sapsford and Jupp (1996) define 'validity' as 'the design of research to provide credible conclusions; whether the evidence which the research offers can bear the weight of the interpretation that is put on it'. High validity is the absence of systematic errors in the measuring instrument. When an instrument is valid; it truly reflects the concept it is supposed to measure (Wood and Haber, 1998). Bell (2005) gives another definition, "Validity is that it tells us whether an item or instrument measures or describes what it is supposed to measure".

After preparing the questionnaire in its initial form ten of well-known person to evaluate the content of the questionnaire. Those chosen based on their experience and profession in this field. The experts generally manifest comforting complacence toward the questionnaire. However, they provide the researcher with some comments and suggestions which are taken into consideration while modifying the questionnaire.

Validity has a number of different aspects and assessment approaches. There are two ways to evaluate instrument validity: (1) content validity and (2) statistical validity, which include criterion-related validity and construct validity.

#### 3.8.1 Content validity of the questionnaire

The content validity of the questionnaire was tested by a panel consisting of ten experts. The ten experts are two lectures in the Islamic University, eight engineering women each with minimum experience of 5 years in engineering work. Each expert was requested to evaluate content validity for each item based on rating the index of content validity. Based on comments of the experts many factors were added, modified or deleted. All additions, omission and the new factors were discussed and

approved by the supervisor and then the questionnaire was finalized to include 87 factors distributed into fourteen groups.

### 3.8.2 Statistical validity of the questionnaire

To insure the validity of the questionnaire, two statistical tests should be applied. The first test is Criterion-related validity test (Pearson test) which measures the correlation coefficient between each item in the field and the whole field. The second test is structure validity test (Pearson test) that used to test the validity of the questionnaire structure by testing the validity of each field and the validity of the whole questionnaire. It measures the correlation coefficient between one field and all the fields of the questionnaire that have the same level of similar scale (Abu-Saleh, 2001).

### 3.8.3 Criterion related validity

#### 1) Internal consistency:

Internal consistency of the questionnaire is measured by a scouting sample, which consisted of **thirty** questionnaires, through measuring the correlation coefficients between each paragraph in one field and the whole field. Tables No.'s (1-10) in annex 3 show the correlation coefficient and p-value for each field items. the p-values are less than 0.05 or 0.01, so the correlation coefficients of this field are significant at  $\alpha = 0.01$  or  $\alpha = 0.05$ , so it can be said that the paragraphs of this field are consistent and valid to be measure what it was set for (attached in the Annex 3).

### 3.8.4 Structure validity of the questionnaire

Structure validity is the second statistical test that used to test the validity of the questionnaire structure by testing the validity of each field and the validity of the whole questionnaire. It measures the correlation coefficient between one field and all the fields of the questionnaire that have the same level of liker scale.

As shown in table (3.4), the significance values are less than 0.05 or 0.01, so the correlation coefficients of all the fields are significant at  $\alpha = 0.01$  or  $\alpha = 0.05$ , so it can be said that the fields are valid to be measured what it was set for to achieve the main aim of the study (attached in the Annex 3).

## 3.9 Reliability of the research

The reliability of an instrument is the degree of consistency which measures the attribute; it is supposed to be measuring (Polit and Hunger, 1985). The less variation an instrument produces in repeated measurements of an attribute, the higher its reliability. Reliability can be equated with the stability, consistency, or dependability of a measuring tool. The test is repeated to the same sample of people on two occasions and then compares the scores obtained by computing a reliability coefficient (Polit and Hunger, 1985). For the most purposes reliability coefficients above **0.7** are considered satisfactory. Period of two weeks to a month is recommended between two tests (Burns & Grove, 1987).

It is difficult to return the scouting sample of the questionnaire that is used to measure the questionnaire validity to the same respondents due to the different work conditions

to this sample. The statistician's explained that, overcoming the distribution of the questionnaire twice to measure the reliability can be achieved by using Kronpakh Alpha coefficient and Half Split Method through the SPSS software.

**Table (3.4) Structure validity of the questionnaire**

#	Section	Pearson correlation coefficient	p-value
1	The ability of women to work in the field of engineering	0.674	0.000
2	The personal qualities of an engineer	0.750	0.000
3	Discrimination against Women	0.701	0.000
4	Family and parents	0.826	0.000
5	Male dominance on the engineering profession	0.698	0.000
6	Culture	0.573	0.001
7	Social value and prestige related with engineer	0.601	0.000
8	The role of women and the stereotypical image of	0.524	0.003
9	Work environment and working hours	0.724	0.000
10	Women's preference for other professions	0.478	0.007

### 3.9.1 Split-Half coefficient method

This method depends on finding Pearson correlation coefficient between the means of odd rank questions and even rank questions of each field of the questionnaire. Then, correcting the Pearson correlation coefficients can be done by using Spearman Brown correlation coefficient of correction. The corrected correlation coefficient (consistency coefficient) is computed according to the following equation: Consistency coefficient =  $2r/(r+1)$ , where r is the Pearson correlation coefficient. The normal range of corrected correlation coefficient  $2r/(r+1)$  is between 0.0 and + 1.0. (Burns & Grove, 1987). As shown in Table (3.18), and the general reliability for all items equal 0.8409, and the significant ( $\alpha$ ) is less than 0.05 so all the corrected correlation coefficients are significance at  $\alpha = 0.05$ . It can be said that according to the Half Split method, the dispute causes group are reliable.

**Table (3.5) Split-Half coefficient method**

#	Section	person-correlation	Spearman-Brown Coefficient	Sig. (2-Tailed)
1	The ability of women to work in the field of engineering	0.7574	0.8620	0.000
2	The personal qualities of an engineer	0.7296	0.8436	0.000
3	Discrimination against Women	0.7525	0.8588	0.000
4	Family and parents	0.6924	0.8182	0.000
5	Male dominance on the engineering profession	0.7895	0.8824	0.000
6	Culture	0.7758	0.8737	0.000
7	Social value and prestige related with engineer	0.6881	0.8152	0.000
8	The role of women and the stereotypical image of Engineering	0.7249	0.8405	*,**
9	Work environment and working hours	0.7459	0.8545	0.000
10	Women's preference for other professions	0.8125	0.8966	
	<b>Total</b>	0.7255	0.8409	0.000

### 3.9.2 Cronbach's coefficient alpha

This method is used to measure the reliability of the questionnaire between each field and the mean of the whole fields of the questionnaire. The normal range of Cronbach's coefficient alpha value between 0.0 and + 1.0, and the higher values reflects a higher degree of internal consistency (George and Mallery, 2003).

The closer the Alpha is to 1, the greater the internal consistency of items in the instrument being assumed. The formula that determines alpha is fairly simple and makes use of the items (variables), k, in the scale and the average of the inter-item correlations, r:

$$\alpha = \frac{k r}{1 + (k-1) r} \quad (\text{George and Mallery, 2003}).$$

Where:

$0.9 \leq \alpha \leq 1.0$	Excellent
$0.8 \leq \alpha \leq 0.9$	Good
$0.7 \leq \alpha \leq 0.8$	Acceptable
$0.6 \leq \alpha \leq 0.7$	Questionable
$0.5 \leq \alpha \leq 0.6$	Poor
$0.0 \leq \alpha \leq 0.5$	Unacceptable

One can see from this formula that if you increase the number of items, you increase Cronbach's alpha. Additionally, if the average inter-item correlation is low, alpha will be low. As the average inter-item correlation increases, Cronbach's Alpha increases. This makes sense intuitively - if the inter-item correlations are high, and then there is evidence that the items are measuring the same underlying construct. This is really what is meant when someone says they have "high" or "good" reliability.

Result shown in Table (3.6) the Cronbach's coefficient alpha was calculated for the first field of the causes of claims, the second field of common procedures and the third field of the Particular claims. And the general reliability for all items equal 0.8937. This range is considered high; the result ensures the reliability of the questionnaire.

**Table (3.6) Reliability Coefficient Cronbach's Alpha technique**

#	Section	Cronbach's Alpha
1	The ability of women to work in the field of engineering	0.8641
2	The personal qualities of an engineer	0.8678
3	Discrimination against Women	0.8896
4	Family and parents	0.8391
5	Male dominance on the engineering profession	0.9157
6	Culture	0.8757
7	Social value and prestige related with engineer	0.8425
8	The role of women and the stereotypical image of Engineering	0.8719
9	Work environment and working hours	0.8805
10	Women's preference for other engineering professions	0.9012
	<b>Total</b>	0.8937



### 3.10 Data processing and analysis

The collected raw data was first sorted, edited, coded and then entered into computer software. We use SPSS software program. Appropriate graphical representations and tables were obtained to understand and analyze the questions. The ordinal scale was used in the analysis process. The ordinal scale is a ranking or rating data which normally uses integers in a seconding or descending order. The relative importance index (RII) was used in the analysis in addition to other approaches such as the one way ANOVA and frequencies and percentiles.

The relative important index and the mean values were used in this research. Triple scaling was used for ranking questions that have an agreement levels. The respondents were asked to give their perceptions in group of questions on five-point scale, which reflects their assessment regarding the factors affecting women choice her career. To determine the relative ranking of the factors, the scores were transformed to importance indices based on the following formula {Skitmore, et al. (2009), Enshassi, et al. (2009). Abd El Razek (2008); Sweis et al. (2008); Sambasivan, Assaf, et al. (2006); Egemen and Mohamed (2005); Peters et al. (2001); Chan and Kumaraswamy (1996) and others used this formula}

$$\text{Formula Relative importance Index} = \frac{\sum w}{AN} = \frac{5n_5 + 4n_4 + 3n_3 + 2n_2 + 1n_1}{5N}$$

Where  $W$  is the weighting given to each factor by the respondent, ranging from 1 to 5 ,

$n_1$  = number of respondents for strongly disagreed,  $n_2$  = number of respondents for disagreed,

$n_3$  = number of respondents for Not sure,  $n_4$  = number of respondents for agreed,  $n_5$  = number of respondents for strongly agreed.  $A$  is the highest weight (i.e 5 in the study) and  $N$  is the total number of samples. The relative importance index ranges from 0 to 100

SPSS program was used to analyze all items. The main factors which are used in analysis were the mean and the percentage weight. Ranking was followed by comparison of Relative importance Index among the items. The analyzed data was finally presented using descriptive and analytical methods for easy interpretation and to enable comparisons and inferences to be drawn.

#### 3.10.1 ANOVA test

Analysis of Variance, or ANOVA, is the standard technique for quantifying and partitioning sample variance in experimental data (OriginLab, 2012). One-way analysis of variance (ANOVA) tests allow you to determine if one given factor has a significant effect on any of the groups under study (silicon Genetics, 2003). One way ANOVA test use to test the difference at the opinion of the respondent in the content of the factor, and there is a difference if the p- value < 0.05, and there is no significant difference if the p- value > 0.05.

### 3.11 Statistical analysis

To achieve the research goal, researcher used the statistical package for the Social Science (SPSS version 18) for Manipulating and analyzing the data.

#### 3.11.1 One-Sample Kolmogorov-Smirnov Test

**One Sample K-S** test will be used to identify if the data follow normal distribution or not, this test is considered necessary in case testing hypotheses as most parametric Test stipulate data to be normality distributed and this test used when the size of the sample are greater than 50 (Erceg-Hurn and Mirosevich, 2008).

Results test as shown in table (3.7), clarifies that the calculated p-value is greater than the significant level which is equal 0.05 (p-value. > 0.05), this in turn denotes that data follows normal distribution, and so parametric Tests must be used.

#### 3.11.2 Factor analysis

Factor analysis attempts to identify underlying variables, or factors, that explain the pattern of correlations within a set of observed variables (Kalaiselvi, 2009). Factor analysis is often used in data reduction to identify a small number of factors that explain most of the variance observed in a much larger number of manifest variables (Stapleton, 2007). Factor analysis can also be used to generate hypotheses regarding causal mechanisms or to screen variables for subsequent analysis (Kalaiselvi, 2009).

##### Factor analysis can take two main forms

1. **Exploratory factor analysis:** the use of factor analysis (principal components analysis in particular) to explore previously unknown groupings of variables, to seek underlying patterns, clustering's and groups (Kalaiselvi, 2009).
2. **Confirmatory factor analysis** is more stringent, testing a found set of factors against a hypothesized model of groupings and relationships (Kalaiselvi, 2009).

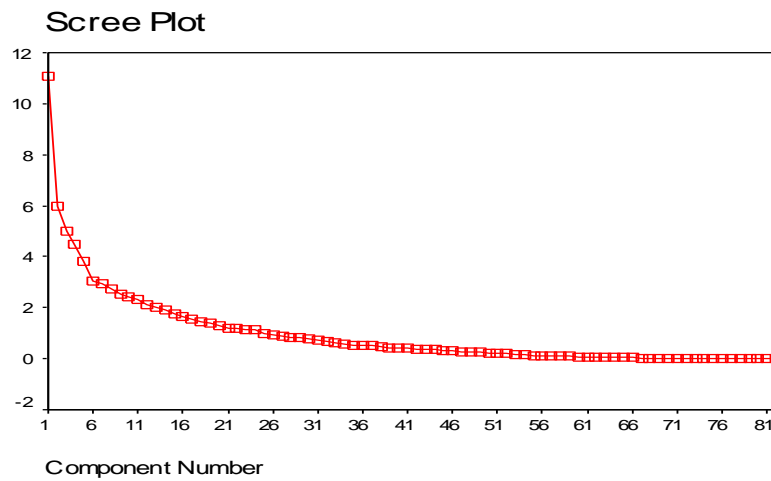
In this research exploratory factor analysis was used to explore previously unknown groupings of variables, to seek underlying patterns. And extraction method was used Principal components analysis.

Table (3.8) shows the actual factors that were extracted. At the section labeled "Rotation sums of squared loadings," shows only those factors that met your cut-off criterion (extraction method). SPSS always extracts as many factors initially as there are variables in the dataset, but the rest of these didn't make the grade. The "% of variance" column tells how much of the total variability (in all of the variables together) can be accounted for by each of these summary scales or factors. Factor 1 account for 7.053% of the variability in all 81 variables, and so on. The ten factor together accounts for 53.585% of the variability in all 81 variables. "Extraction sums of squared loadings" which mean percentage of variance

**Table (3.7) One Sample Kolmogorov-Smirnov Test**

#	Section	Statistic	P-value
1	The ability of women to work in the field of engineering	0.772	0.590
2	The personal qualities of an engineer	1.341	0.055
3	Discrimination against Women	1.086	0.189
4	Family and parents	0.934	0.348
5	Male dominance on the engineering profession	1.291	0.072
6	Culture	1.216	0.104
7	Social value and prestige related with engineer	0.987	0.284
8	The role of women and the stereotypical image of Engineering	1.113	0.168
9	Work environment and working hours	1.356	0.051
10	Women's preference for other professions than engineering professions	1.159	0.136
	<b>Total</b>	1.016	0.254

Figure (3.2) show the scree plot with thunderbolt indicating the point of inflexion on the curve and lead to a slightly different conclusion it looks like the slope of this curve levels out after just ten factors, rather than three.



**Figure (3.2) Scree plot**

**Table (3.8) Total Variance Explained**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	11.048	13.473	13.473	11.048	13.473	13.473	5.783	7.053	7.053
2	5.971	7.282	20.755	5.971	7.282	20.755	5.763	7.028	14.081
3	5.024	6.127	26.882	5.024	6.127	26.882	5.206	6.349	20.430
4	4.483	5.467	32.348	4.483	5.467	32.348	4.628	5.643	26.073
5	3.840	4.683	37.031	3.840	4.683	37.031	4.554	5.554	31.627
6	3.046	3.714	40.746	3.046	3.714	40.746	4.303	5.248	36.875
7	2.941	3.586	44.332	2.941	3.586	44.332	3.800	4.634	41.509
8	2.728	3.327	47.659	2.728	3.327	47.659	3.738	4.559	46.068
9	2.534	3.090	50.748	2.534	3.090	50.748	3.160	3.854	49.922
10	2.408	2.937	53.685	2.408	2.937	53.685	3.086	3.763	53.685
11	2.335	2.847	56.532						
12	2.143	2.613	59.145						
13	1.991	2.428	61.573						
14	1.905	2.324	63.897						
15	1.757	2.143	66.040						
16	1.665	2.031	68.071						
...	...	...	...	...	...	...	...	...	...

### **KMO and Bartlett's Test of Sphericity (Factor Analysis)**

1. **The Kaiser-Meyer-Olkin** Measure of Sampling Adequacy tests whether the partial correlations among variables are small. KMO is a statistic that indicated the proportion of variance in your variables that might be caused by underlying factors (KMO = 0.881). High values (close to 1.0) generally indicate that a factor analysis may be useful with your data. If the value is less than 0.50, the results of the factor analysis probably won't be very useful figure (3.4) show SPSS version 18 outputs.
2. **Bartlett's test of sphericity** tests whether the correlation matrix is an identity matrix, which would indicate that the factor model is inappropriate. Which would indicate that variables are unrelated and therefore unsuitable for structure detection? Small values (less than 0.05) of the significance level indicate that a factor analysis may be useful with your data. The Approx. Chi-Square = 15455.68, and the p-value = 0.000 which is less than 0.05 figure (3.3) show SPSS version 18 outputs.

### KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.881
Bartlett's Test of Sphericity	Approx. Chi-Square	15455.688
	df	2850
	Sig.	.000

Figure (3.3) KMO and Bartlett's Test

## CHAPTER 4

### RESULTS AND DISCUSSION

#### 4.1. Introduction

This chapter introduces the survey results and the discussion of the questionnaires output of 175 questionnaires returned from female students, Unemployment engineering women, Employment engineering women. And 50 questionnaires distributed to engineering companies that are Employment in different engineering discipline.

Part one will present questionnaires were distributed to female students; Employment engineering women and unemployment engineering women, *profiles and all necessary* information about the respondent's engineering women will be presented.

Part two will present questionnaires were distributed to female students; Employment engineering women and unemployment engineering women. *Comparison between civil engineering* and other engineering disciplines related to factors affecting women when choice their career in engineering. There are 10 groups for each discipline of sample and state of engineering women that presented in part one then comparison between each discipline. The groups are the ability of women to work in the field of engineering, male dominance on the engineering profession, the personal qualities of an engineer engineering women, social value and prestige related with engineer, work environment and working hours, family and parents, discrimination against Women, historical role of women, culture, group number ten.

Part three will present questionnaires were distributed to female students; Employment engineering women and Unemployment engineering women, *the opinion of all sample* in most factor effect women to choice engineering as career, most factor effect women to choice other sector than engineer, popularity of some engineering discipline for engineering women, relationship between culture and perceived image of engineering on recruiting women to studying.

Part four will present questioner *distributed to company* that Employment in different engineering discipline and their perception of work of engineering women in their company.

Part five will present the factor analysis and comparison between the result of factor analysis and relative important index "RII".

## Part one: Profile of sample

## 4.2 Part one: Profile of sample

Table (4.1) indicated that engineering women state was present 62.9 % employment engineering women, 10.9% unemployment engineering women and 26.3 was female students. Employment sector for Employment engineering women was present 49.1% work in Governmental organization sector, 30.9% work in private organization sector, 12.7% work in civil sector and 7.3% work in international organization. Experience of Employment engineering women presented 48.2% have experience less than 5 years, 35.5% have experience between (5-10) years, 11.8% have experience between (11-15) years and 4.5% have experience more than 15 years. Discipline of sample present 22.3% civil engineer, 20% Architecture engineer, 16.6% communication engineer, 37.1% computer engineer and 4% was industry engineer.

**Table (4.1): Profile of sample**

	Frequency	Percentages
<b>5. Engineering women state</b>		
Employment engineering women	110	62.9
Unemployment engineering women	19	10.9
Female students	46	26.3
<b>Total</b>	<b>175</b>	<b>100</b>
<b>6. Employment sector for Employment engineering women</b>		
Governmental organization	54	49.1
private organization	34	30.9
Civil organization	14	12.7
International organization	8	7.3
<b>Total</b>	<b>110</b>	<b>100</b>
<b>7. Experience of Employment engineering women</b>		
Less than 5 years	53	48.2
(5-10) years	39	35.5
(11-15) years	13	11.8
More than 15 years	5	4.5
<b>Total</b>	<b>110</b>	<b>100.00</b>
<b>8. Discipline of sample</b>		
Civil	39	22.3
Architecture	35	20.0
Communication	29	16.6
Computer	65	37.1
Industry	7	4
<b>Total</b>	<b>175</b>	<b>100.0</b>



**Part two: Comparison between engineering disciplines related to factors affecting women when choice her career in engineering.**

### **4.3 Part two: Comparison between engineering disciplines related to factors affecting women when choice her career in engineering.**

This part will cover the first objective of this research. This objective is comparison between the different engineering disciplines related to the factors affecting women career choice. And will discuss 10 groups of factors that affecting women when choice her career in engineering in details as follow:

1. Comparison between the categories of samples that female student's engineer, Employment engineering women, Unemployment engineering women for each discipline in each group. The discussion will be as follow:
  - The most two important factors will be discussed.
  - The least important factor will be discussed.
  - Factors have significant difference in opinion that's mean P-value less than 0.05.
2. Comparison between each discipline for each group.
3. Test hypothesis if it is found in each group.

#### **This part consists of 10 groups as follows:**

1. The ability of women to work in the field of engineering
2. Male dominance on the engineering profession
3. The personal qualities of an engineer engineering women
4. Social value and prestige related with engineer
5. Work environment and working hours
6. Family and parents
7. Discrimination against women
8. Historical role of women
9. Culture
10. Group number ten

#### **4.3.1 First group: the ability of women to work in the field of engineering**

##### **4.3.1.1 Discipline: Civil engineering women**

Table (4.2) show the relative importance indices and ranks of factors of the first group " *The ability of women to work in the field of engineering*" this group contains 12 factors.

Table (4.2) indicated that "*women prefer work in sectors such as teaching, trade more than engineering specialty*" was ranked in the first position by both Employment engineering women with RII (71.3) and Unemployment engineering women with RII (80) also ranked in the first position in overall sample of civil engineering women with RII (70.26). In my opinion, this result was very appropriate for women to work in teaching, few working hour, financial return approximately about the financial return of engineering work. Also this result explains the low number of engineering women when compared with number of women in education work. This result agreed with Madikizela and Haupt (2010), Chovwen (2003), Ososki et al. (2006) who mentioned that women employed in traditional career like teaching and nursing. And this result agreed with study in South African done by Madikizela (2008) who stated that small percentage of African women in the Employment sector is found mostly in the teaching and nursing professions.

**Table (4.2) Rank and RII of first Group: The ability of women to work in Civil engineering specialization**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Women prefer jobs in sectors such as teaching, trade more than engineering specialty.	70.26	1	71.33	1	80.00	1	50.00	4	0.128
Lack of facilities equipped to care for children in our society affect women to choose engineering profession.	69.74	2	70.00	3	76.00	2	60.00	2	0.547
Inability to balance between the demands of work and family is a major cause in the reluctance of many women for engineering work.	69.23	3	70.67	2	68.00	4	60.00	2	0.573
Vacations abound with a married woman and have young children.	67.18	4	68.00	4	80.00	1	45.00	6	0.047
High prices facilities special for children affect women to choose engineering profession.	65.13	5	64.00	5	72.00	3	65.00	1	0.703
Women physically unsuited to allocate engineering as men.	58.46	6	61.33	6	44.00	7	55.00	3	0.407
Some materials and tools used in engineering make a problem for women.	58.46	6	58.00	7	56.00	6	65.00	1	0.774
Women with young children cannot work at the site.	56.92	7	55.33	9	60.00	5	65.00	1	0.690
Women take more vacation than men.	56.41	8	57.33	8	64.00	4	40.00	7	0.352
Prevail engineered the idea that leaving them to work in the field of engineering, it will eliminate the male unemployment.	55.90	9	55.33	9	64.00	4	50.00	5	0.735
A low concentration of women and their productivity at work when they are married and have children.	54.36	10	52.00	11	64.00	4	60.00	2	0.332
Women Employment in engineering adversely affect family stability.	52.82	11	53.33	10	60.00	5	40.00	7	0.271
<b>All factors</b>	61.24		61.39		65.67		54.58		0.484

"Lack of facilities equipped to care for children in our society affect women to choose engineering profession" it was ranked in the second position in overall sample engineer with RII (69.74), in Unemployment engineering women with RII (76.00), and female students with RII (60.00). It was ranked in third position for Employment engineering women with RII (70.00). In our country most children facilities are profit facilities and not appropriate for children care under the level of stander. These lead women to make decision to choose their family care and leave her work. If they work in private organization sector were the financial return is very low. My country was needed to improving the Employment environment further to make the work place more comfortable for female worker. This could be done by providing baby seating facilities to Employment mothers, time allowances to suckling mothers and extension of the maternity leave period.

"Women Employment in engineering adversely affect family stability" was ranked in the last position of overall sample with RII (52.82), ranked in position number ten for Employment engineering women with RII (53.33), was ranked in position five for Unemployment engineering women with RII (60.00), and ranked in position seven for female students with RII (40.00). This result in line with the result of Fearfull and

Kamenou (2006) they motioned that women often makes their 'choices' with their family circumstances and responsibilities in mind.

*"Vacations abound with a married woman and have young children"* the p-value of this factor is 0.047 is less than .05 so it was difference in the opinion of employment engineering women, Unemployment engineering women, and female students. It was ranked in fourth position in overall sample with RII (67.18) and fourth position in Employment engineering women with RII (68.00), ranked in first position for Unemployment engineering women with RII (80.00) and in sixth position for female students with RII (45.00). Actually, married women and have children take number of vacations more than women who don't have children. She takes day off for much reason such as sick leave, occasional vacation, maternity leave, suckling hour. Unemployment engineering women don't feel that's problem. In my work every manager wants women who not married and they advocate to not employing women in the work for this reason. This result is compatible with the result of Fearfull and Kamenou (2006) that women often make their 'choices' with their family circumstances and responsibilities in mind.

#### **4.3.1.2 Discipline: Architecture engineering women**

Table (4.3) indicated that *"Inability to balance between the demands of work and family* is a major cause in the reluctance of many women for engineering work "was ranked in the first position in Employment engineering women with RII (74.4) and female students with RII (80.00) also ranked in the first position in overall sample of Architecture engineering women with RII (76.57) and in second position of Unemployment engineering women with RII (84.00). In my opinion, most women perceived that they had to make a choice between a career and a family-oriented lifestyle and saw little opportunity for work-life balance. This result agreed with Hill (2010) when discuss that women leave STEM "science, technology, engineering, and mathematics" academic careers because they cannot balance between work and family responsibilities. Also agreed with what mentioned by (Frehill et al., 2009) in business and industry both women and men identify family responsibilities as a possible barrier to advancement, but women are affected differently than men by this "family penalty". And also agreed with Ferguson and Sharples (1994) and Fearfull and Kamenou (2006) they stated that women often make their 'choices' with their family circumstances and responsibilities in mind. This factor is very important when attracting women to the profession, so women prefer work help them balancing job and family responsibilities.

*"Lack of facilities equipped to care for children in our society affect women to choose engineering profession"* was ranked in the first position of Unemployment engineering women with RII (96.00), ranked in the second position in overall Architecture engineering women with RII (73.71), and in Employment engineering women with RII (68.80), and in female students with RII (76.00). This point discuss in page number 4.

*"Prevail engineered the idea that leaving them to work in the field of engineering, it will eliminate the male unemployment"* was ranked in the last position in Architecture engineering women related to *" the ability of Architecture engineering women to work in the field of engineering "* this result refutes claim a lot of men that leaving women to work give a chance to get the man a job.

**Table (4.3) The ability of women to work in Architecture field specialization**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Inability to balance between the demands of work and family is a major cause in the reluctance of many women for engineering work.	76.57	1	74.40	1	84.00	2	80.00	1	0.284
Lack of facilities equipped to care for children in our society affect women to choose engineering profession.	73.71	2	68.80	2	96.00	1	76.00	2	0.015
Vacations abound with a married woman and have young children.	68.57	3	68.00	2	68.00	4	72.00	3	0.928
High prices facilities special for children affect women to choose engineering profession.	67.43	4	63.20	3	84.00	2	72.00	3	0.075
Women prefer jobs in sectors such as teaching, trade more than engineering specialty.	65.71	5	62.40	4	76.00	3	72.00	3	0.384
Some materials and tools used in engineering make problem for omen.	60.00	6	57.60	5	64.00	5	68.00	4	0.499
A low concentration of women and their productivity at work when they are married and have children.	59.43	7	56.00	7	68.00	4	68.00	4	0.316
Women physically unsuited to allocate engineering as men.	58.29	8	50.40	10	84.00	2	72.00	3	0.006
Women Employment in engineering adversely affect family stability.	57.14	9	54.40	8	64.00	5	64.00	5	0.433
Women with young children cannot work at the site.	56.00	10	54.40	8	68.00	4	52.00	7	0.444
Women take more vacation than men.	54.29	11	53.60	9	52.00	7	60.00	6	0.836
Prevail engineered the idea that leaving them to work in the field of engineering, it will eliminate the male unemployment.	54.29	11	56.80	6	60.00	6	36.00	8	0.194
<b>All factors</b>	<b>62.62</b>		<b>60.00</b>		<b>72.33</b>		<b>66.00</b>		<b>0.123</b>

"Women physically unsuited to allocate engineering as men" the p-value of this factor is 0.006 is less than .05 so there is difference in the opinion of the Employment , Unemployment , and female students of Architecture engineering women. It was ranked in position eight in overall sample with RII (58.29) and in position ten in Employment engineering women with RII (50.40) also in the second position for Unemployment engineering women with RII (84.00) and in third position for female students with RII (72.00). Actually, some task in engineering is not suited to engineering women in all discipline any way in other hand many task are suited for women rather than man like brain storm, design, management task and others. This result agreed with Matope (2007) , Aulin and Jingmond (2011) and Clarke et al. (2005) when they found that most women seem to agreed that they can cope with the physical part of the job, while many claimed that they need to be psychologically strong to be on a building site. The women on site feel that they need to be as good as the men. They also need to fit into the accepted behavior of the workplace which can even mean comprising their 'female' identity.

#### 4.3.1.3 Discipline: Communication engineering women

Table (4.4) indicated that "women prefer work in sectors such as teaching, trade more than engineering specialty" was ranked in the first position by each of overall sample communication engineering women with RII (77.93), Unemployment engineering women with RII (90.00), ranked in the first position in female students sample of engineering women with RII (86.67), and in the second position of Employment engineering women with RII (74.55). This factor discussed in page number (4).

"Inability to balance between the demands of work and family is a major cause in the reluctance of many women for engineering work." was ranked in the first position in Employment engineering women with RII (77.27) and female students with RII (66.67) also ranked in the second position in overall sample of communication engineering women with RII (75.17) and in fourth position of Unemployment engineering women with RII (70.00). This factor discussed in page number (4).

"Prevail engineered the idea that leaving them to work in the field of engineering, it will eliminate the male unemployment" was ranked in the last position in communication engineering women related to "the ability of communication engineering women to work in the field of engineering" this result refutes claim a lot of men that leaving women to work give a chance to get the man a job. This result is the same of Architecture engineering women. This factor discussed in page number (4).

**Table (4.4) The ability of women to work in communications engineering specialization**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Women prefer jobs in sectors such as teaching, trade more than engineering specialty.	77.93	1	74.55	2	90.00	1	86.67	1	0.167
Inability to balance between the demands of work and family is a major cause in the reluctance of many women for engineering work.	75.17	2	77.27	1	70.00	4	66.67	1	0.518
Vacations abound with a married woman and have young children.	71.03	3	70.91	3	75.00	3	66.67	1	0.830
Lack of facilities equipped to care for children in our society affect women to choose engineering profession.	71.03	3	70.00	4	80.00	2	66.67	1	0.496
High prices facilities special for children affect women to choose engineering profession.	66.21	4	65.45	6	70.00	4	66.67	1	0.892
Some materials and tools used in engineering make a problem for women.	66.21	4	66.36	5	75.00	3	53.33	3	0.381
Women take more vacation than men.	62.07	5	64.55	7	60.00	6	46.67	4	0.387
Women with young children cannot work at the site.	59.31	6	56.36	10	70.00	4	66.67	1	0.301
Women physically unsuited to allocate engineering as men.	59.31	6	58.18	8	65.00	5	60.00	2	0.845
A low concentration of women and their productivity at work when they are married and have children.	58.62	7	56.36	10	70.00	4	60.00	2	0.375
Women Employment in engineering adversely affect family stability.	56.55	8	57.27	9	55.00	7	53.33	3	0.910
Prevail engineered the idea that leaving them to work in the field of engineering, it will eliminate the male unemployment.	56.55	8	58.18	8	60.00	6	40.00	5	0.269
<b>All factors</b>	65.00		64.62		70.00		61.11		0.584

#### 4.3.1.4 Discipline: Computer engineering women

Table (4.5) indicated that "women prefer work in sectors such as teaching, trade more than engineering specialty" was ranked in the first position in each of overall sample computer engineering women with RII (74.15) and Employment engineering women with RII (77.24) also ranked in the second position in female students with RII (71.88), and in Unemployment women engineer with RII (70.00). This factor discussed in page number (4).

"Lack of facilities equipped to care for children in our society affect women to choose engineering profession" was ranked in the second position in overall computer sample engineer with RII (71.69), and in Unemployment engineering women with RII (75.00), ranked in the third position in female students sample with RII (70.63), and ranked in third position in Employment women computer engineer with RII (72.41). This result discussed in page number (4).

"Prevail engineered the idea that leaving them to work in the field of engineering, it will eliminate the male unemployment" was ranked in the last position in computer engineering women related to " the ability of computer engineering women to work in the field of engineering " this result refutes claim a lot of men that leaving women to work give a chance to get the man a job. P-value of this factor is (0.000) is less than (.005) so it is difference in opinion of all category of computer engineer.

**Table (4.5) The ability of women to work in computer engineering field specialization**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Women prefer jobs in sectors such as teaching, trade more than engineering specialty.	74.15	1	77.24	1	70.00	2	71.88	2	0.429
Lack of facilities equipped to care for children in our society affect women to choose engineering profession.	71.69	2	72.41	3	75.00	1	70.63	3	0.856
High prices facilities special for children affect women to choose engineering profession.	69.23	3	66.21	5	60.00	4	73.13	1	0.201
Inability to balance between the demands of work and family is a major cause in the reluctance of many women for engineering work.	69.23	3	75.86	2	75.00	1	62.50	4	0.015
Vacations abound with a married woman and have young children.	65.85	4	70.34	4	75.00	1	60.63	7	0.059
Some materials and tools used in engineering make a problem for women.	63.08	5	64.14	6	65.00	3	61.88	5	0.887
A low concentration of women and their productivity at work when they are married and have children.	61.54	6	61.38	7	75.00	1	60.00	8	0.327
Women physically unsuited to allocate engineering as men.	59.69	7	59.31	9	50.00	5	61.25	6	0.595
Women take more vacation than men.	58.15	8	61.38	7	60.00	4	55.00	11	0.544
Women with young children cannot work at the site.	56.62	9	57.24	10	55.00	5	56.25	9	0.958
Women Employment in engineering adversely affect family stability.	55.38	10	55.86	11	50.00	5	55.63	10	0.840
Prevail engineered the idea that leaving them to work in the field of engineering, it will eliminate the male unemployment.	51.08	11	60.69	8	75.00	1	39.38	12	0.000
<b>All factors</b>	<b>62.97</b>		<b>65.17</b>		<b>65.42</b>		<b>60.68</b>		<b>0.231</b>

#### 4.3.1.5 Discipline: Industry engineering women

Table (4.6) indicated that *"inability to balance between the demands of work and family is a major cause in the reluctance of many women for engineering work"* was ranked in the first position for each overall sample of industry engineering women with RII (68.57), Employment engineering women with RII (80.00), Unemployment industry engineering women with RII (40.00), and ranked in second position of female students with RII (60.00). This factor discussed in page (4).

*"Some materials and tools used in engineering make a problem for women"* was ranked in the second position for each overall sample of industry engineering women with RII (62.86), Employment engineering women with RII (60.00), also was ranked in the first position of Unemployment industry engineering women with RII (40.00), and in the second position of female students with RII (80.00). This result agreed with Madikizela(2008) when he found in his study that 41.8% agreed that some materials presented manual material handling problems for women.

*"Women physically unsuited to allocate engineering as men"* were ranked in last position for each overall sample with RII (40.00), in Employment engineering women with RII (30.00), in Unemployment engineering women with RII (40.00), and in female students with RII (60.00). This factor discussed above.

*"A low concentration of women and their productivity at work when they are married and have children"* the p-value of this factor is 0.011 is less than .05 so there is difference in the opinion of the employment, unemployment, and female students of industry engineering women. It was ranked in position eight in overall sample with RII (45.71) and in in Employment engineering women with RII (30.00), ranked in the first position for Unemployment engineering women with RII (40.00) and in female students with RII (80.00). This result agreed with Fearfull and Kamenou (2006) they stated that women often make their 'choices' with their family circumstances and responsibilities in mind. So this factor depends on engineering women and her circumstances.



**Table (4.6) The ability of women to work in industry engineering field of specialization**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Inability to balance between the demands of work and family is a major cause in the reluctance of many women for engineering work.	68.57	1	80.00	1	40.00	1	60.00	2	.
Some materials and tools used in engineering make a problem for women.	62.86	2	60.00	2	40.00	1	80.00	1	0.459
Women prefer jobs in sectors such as teaching, trade more than engineering specialty.	60.00	3	55.00	3	40.00	1	80.00	1	0.210
High prices facilities special for children affect women to choose engineering profession.	54.29	4	55.00	3	40.00	1	60.00	2	0.643
Lack of facilities equipped to care for children in our society affect women to choose engineering profession.	54.29	5	55.00	3	40.00	1	60.00	2	0.643
Prevail engineered the idea that leaving them to work in the field of engineering, it will eliminate the male unemployment.	51.43	6	50.00	4	40.00	1	60.00	2	0.858
Vacations abound with a married woman and have young children.	48.57	7	35.00	7	40.00	1	80.00	1	0.080
A low concentration of women and their productivity at work when they are married and have children.	45.71	8	30.00	8	40.00	1	80.00	1	0.011
Women take more vacation than men.	45.71	8	40.00	6	40.00	1	60.00	2	0.652
Women Employment in engineering adversely affect family stability.	42.86	9	45.00	5	40.00	1	40.00	3	0.766
Women with young children cannot work at the site.	40.00	10	30.00	8	40.00	1	60.00	2	0.063
Women physically unsuited to allocate engineering as men.	40.00	11	30.00	8	40.00	1	60.00	2	0.063
<b>All factors</b>	51.19		47.08		40.00		65.00		0.349

### 4.3.1.6 Comparison for each discipline

Table (4.7) Comparison for each discipline related to the first group "the ability of engineering women to work in the field of engineering"

Ranked	Civil	RII	Architecture	RII	Communication	RII	Computer	RII	Industry	RII
1	Women prefer jobs in sectors such as teaching, trade more than engineering specialty.	70.26	Inability to balance between the demands of work and family is a major cause in the reluctance of many women for engineering work.	76.57	Women prefer jobs in sectors such as teaching, trade more than engineering specialty.	77.93	Women prefer jobs in sectors such as teaching, trade more than engineering specialty.	74.15	Inability to balance between the demands of work and family is a major cause in the reluctance of many women for engineering work.	68.57
2	Lack of facilities equipped to care for children in our society affect women to choose engineering profession.	69.74	Lack of facilities equipped to care for children in our society affect women to choose engineering profession.	73.71	Inability to balance between the demands of work and family is a major cause in the reluctance of many women for engineering work.	75.17	Lack of facilities equipped to care for children in our society affect women to choose engineering profession.	71.69	Some materials and tools used in engineering make a problem for women.	62.86
3	Inability to balance between the demands of work and family is a major cause in the reluctance of many women for engineering work.	69.23	Vacations abound with a married woman and have young children.	68.57	Vacations abound with a married woman and have young children.	71.03	High prices facilities special for children affect women to choose engineering profession.	69.23	Women prefer jobs in sectors such as teaching, trade more than engineering specialty.	60.00
4	Vacations abound with a married woman and have young children.	67.18	High prices facilities special for children affect women to choose engineering profession.	67.43	Lack of facilities equipped to care for children in our society affect women to choose engineering profession.	71.03	Inability to balance between the demands of work and family is a major cause in the reluctance of many women for engineering work.	69.23	High prices facilities special for children affect women to choose engineering profession.	54.29
5	High prices facilities special for children affect women to choose engineering profession.	65.13	Women prefer jobs in sectors such as teaching, trade more than engineering specialty.	65.71	High prices facilities special for children affect women to choose engineering profession.	66.21	Vacations abound with a married woman and have young children.	65.85	Lack of facilities equipped to care for children in our society affect women to choose engineering profession.	54.29
6	Women physically unsuited to allocate engineering as men.	58.46	Some materials and tools used in engineering make problem for omen.	60.00	Some materials and tools used in engineering make a problem for women.	66.21	Some materials and tools used in engineering make a problem for women.	63.08	Prevail engineered the idea that leaving them to work in the field of engineering, it will eliminate the male unemployment.	51.43
7	Some materials and tools used in engineering make a problem for women.	58.46	A low concentration of women and their productivity at work when they are married and have children.	59.43	Women take more vacation than men.	62.07	A low concentration of women and their productivity at work when they are married and have children.	61.54	Vacations abound with a married woman and have young children.	48.57

**Table (4.7) Comparison for each discipline related to the first group "the ability of engineering women to work in the field of engineering"**

Ranked	Civil	RII	Architecture	RII	Communication	RII	Computer	RII	Industry	RII
8	Women with young children cannot work at the site.	56.92	Women physically unsuited to allocate engineering as men.	58.29	Women with young children cannot work at the site.	59.31	Women physically unsuited to allocate engineering as men.	59.69	A low concentration of women and their productivity at work when they are married and have children.	45.71
9	Women take more vacation than men.	56.41	Women Employment in engineering adversely affect family stability.	57.14	Women physically unsuited to allocate engineering as men.	59.31	Women take more vacation than men.	58.15	Women take more vacation than men.	45.71
10	Prevail engineered the idea that leaving them to work in the field of engineering, it will eliminate the male unemployment.	55.90	Women with young children cannot work at the site.	56.00	A low concentration of women and their productivity at work when they are married and have children.	58.62	Women with young children cannot work at the site.	56.62	Women Employment in engineering adversely affect family stability.	42.86
11	A low concentration of women and their productivity at work when they are married and have children.	54.36	Women take more vacation than men.	54.29	Women Employment in engineering adversely affect family stability.	56.55	Women Employment in engineering adversely affect family stability.	55.38	Women with young children cannot work at the site.	40.00
12	Women Employment in engineering adversely affect family stability.	52.82	Prevail engineered the idea that leaving them to work in the field of engineering, it will eliminate the male unemployment.	54.29	Prevail engineered the idea that leaving them to work in the field of engineering, it will eliminate the male unemployment.	56.55	Prevail engineered the idea that leaving them to work in the field of engineering, it will eliminate the male unemployment.	51.08	Women physically unsuited to allocate engineering as men.	40.00

Table (4.7) indicated that comparison between civil engineer and other engineering discipline factor related to *the ability of engineering women to work in the field of engineering*:

*"Women prefer jobs in sectors such as teaching, trade more than engineering specialty"* ranked in the first position for civil, communication, computer engineering women, but ranked in third position of industry engineering women also ranked in position number five in Architecture engineering women

*"Lack of facilities equipped to care for children in our society affect women to choose engineering profession"* was ranked in the second position of civil, computer, Architecture engineering women, and ranked in third position for communication engineer and also ranked in position number five for industry engineering women.

*"Inability to balance between the demands of work and family is a major cause in the reluctance of many women for engineering work"* was ranked in third position for civil and computer engineer, and ranked in the first position for architect and industry engineering women, also was ranked in second position for communication engineer.

*"Vacations abound with a married woman and have young children"* was ranked in fourth position for civil and computer engineer, and ranked in the third position for architect and communication engineering women, also was ranked in position seven for communication engineer.

*"A low concentration of women and their productivity at work when they are married and have children"* was ranked in position ten for civil, ranked in position seven for architect and communication engineering women, also was ranked in position six for computer engineer, and ranked in position eight for industry engineer.

*"Women Employment in engineering adversely affect family stability"* was ranked in the last position for civil, ranked in position nine for architect and industry engineering women, and ranked in position eight for communication engineer, and ranked in position ten for computer engineering women.

#### **4.3.1.7 First hypotheses tested in this research are**

7. *Null hypothesis(H<sub>0</sub>):* Women have ability to work in the field of engineering (at .05 level).
8. *Alternative hypothesis (H<sub>1</sub>):* Women don't have the ability to work in the field of engineering (at .05 levels).

Table 4.8 indicated that P-value (0.195) > 0.05 for overall sample as whole, but there are several factors inside this group have P-value < 0.05. Thus, null hypothesis is rejected, alternative hypothesis is substantiated for the phase as whole, and null hypothesis is substantiated for some factors.

**Table (4.8) The ability of overall sample of all discipline of engineering women to work in the field of engineering**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Inability to balance between the demands of work and family is a major cause in the reluctance of many women for engineering work.	71.66	1	74.55	1	72.63	3	64.35	3	0.004
Women prefer jobs in sectors such as teaching, trade more than engineering specialty.	71.66	1	70.91	2	76.84	2	71.30	1	0.493
Lack of facilities equipped to care for children in our society affect women to choose engineering profession.	70.86	2	69.82	3	80.00	1	69.57	2	0.079
Vacations abound with a married woman and have young children.	66.86	3	68.00	4	72.63	4	61.74	5	0.080
High prices facilities special for children affect women to choose engineering profession.	66.86	3	64.36	5	70.53	5	71.30	1	0.067
Some materials and tools used in engineering make a problem for women.	61.94	4	61.27	6	63.16	7	63.04	4	0.844
A low concentration of women and their productivity at work when they are married and have children.	58.40	5	55.45	10	67.37	6	61.74	5	0.017
Women physically unsuited to allocate engineering as men.	58.29	6	56.55	9	60.00	9	61.74	5	0.417
Women take more vacation than men.	57.14	7	58.36	7	57.89	10	53.91	8	0.543
Women with young children cannot work at the site.	56.34	8	54.91	11	62.11	8	57.39	6	0.315
Women Employment in engineering adversely affect family stability.	54.86	9	54.73	12	56.84	11	54.35	7	0.875
Prevail engineered the idea that leaving them to work in the field of engineering, it will eliminate the male unemployment.	53.71	10	57.45	8	63.16	7	40.87	9	0.000
<b>All factors</b>	62.38		62.20		66.93		60.94		0.195

As mentioned above that the null hypothesis is substantiated for some factors, this partially substantiated from *the significant difference* (at level 0.05) between the opinions of Employment, Unemployment and female students engineering women in different discipline. These factors are:

1. P-value (0.004) < 0.05 for factor *"Inability to balance between the demands of work and family is a major cause in the reluctance of many women for engineering work"*. So there is *significant difference* between the opinions of Employment, Unemployment and female students engineering women in different discipline.
2. P-value (0.017) < 0.05 for factor *"A low concentration of women and their productivity at work when they are married and have children"*. So there is *significant difference* between the opinions of Employment, Unemployment and female students engineering women in different discipline.
3. P-value (0.000) < 0.05 for factor *"Prevail engineered the idea that leaving them to work in the field of engineering, it will eliminate the male unemployment"*.

So there is *significant difference* between the opinions of Employment, Unemployment and female students engineering women in different discipline.

### 4.3.2 Second group: Male dominance on the engineering profession

#### 4.3.2.1 Discipline: Civil engineering women

Table (4.9) show the relative importance indices and ranks of factors of the second group " *Male dominance on the engineering profession* " this group contains 11 factors.

**Table (4.9) Rank and RII of Second Group: Male dominance on the engineering profession "Civil engineer"**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Few women find a good jobs	81.54	1	82.67	1	80.00	2	75.00	2	0.736
The surrounding environment and the prevailing societal culture affecting the work of women in the field of engineering.	74.36	2	74.67	3	80.00	2	65.00	4	0.455
Discrimination reflect negative image when women choice her career.	73.85	3	74.00	4	80.00	2	65.00	4	0.316
Society's perception of women throughout the wife only makes it less likely for the selection of the engineering profession.	73.33	4	72.67	5	80.00	2	70.00	3	0.732
Men's preference than women to work effect the selection of the engineering profession.	71.28	5	75.33	2	64.00	5	50.00	6	0.049
Engineering women subjected to harassment in the workplace	70.26	6	70.67	6	72.00	4	65.00	4	0.820
Women respected in engineering.	67.69	7	68.00	7	52.00	6	85.00	1	0.020
Preference for men over women when hiring affect the choice of profession in engineering.	64.62	8	66.00	8	76.00	3	40.00	7	0.099
Difficult to get women to the supervisory position affect the choice of profession in engineering.	62.56	9	60.00	9	84.00	1	55.00	5	0.065
Male dominance on the senior administrative positions affect women's choice of profession in engineering.	58.97	10	60.00	9	72.00	4	35.00	8	0.092
Male dominance on some engineering disciplines prevents women from choosing engineering.	57.44	11	58.67	10	72.00	4	30.00	9	0.048
<b>All factors</b>	<b>68.72</b>		<b>69.33</b>		<b>73.82</b>		<b>57.73</b>		<b>0.175</b>

Table (4.9) indicated that " *Few women find good jobs*" was ranked in first position for overall sample of engineering women with RII (81.54), and in Employment engineering women with RII (82.67), ranked in second position Unemployment engineering women with RII (80.00), and in female students with RII (75.00). Actually in our country very few women find good jobs as result of political situation of Gaza strip, also poor and weak of private organization sector they use women because they take a small financial return, small wages for task.in Gaza strip very big company like jawwal company don't have any engineering women from any discipline between their staff employ, communication company have only four engineering women, also electricity company have less than seven engineering women through their staff, a few of engineering office that work in civil and Architecture have engineering women, so this is factor don't encourage women to choose engineer as career. This result agreed with

Madikizela (2008) who stated that women workers were less likely to be organized than men, they were paid less on grounds of their purported secondary earner status, and they had less bargaining power because of the limitations placed on their labour-market options by their unpaid domestic responsibilities. Furthermore, even though there were more women entering the labour force they still remained confined to the lower paid more casual segments of the informal economy. The study also found that women in construction did not enjoy the same opportunities as men.

*"The surrounding environment and the prevailing societal culture affecting the work of women in the field of engineering"* was ranked in second position of overall sample engineering women with RII (74.36), and in Unemployment engineering women with RII (80.00), ranked in third position of Employment engineering women with RII (74.36), and ranked in position four in female students engineer with RII (65.00). This result mean the culture effect women choice of her career and consider as barriers to entry by women, and agreed with found by Taylor(2010) who stated that culture has a major influences on why women have chosen or been restricted from choosing different discipline of engineering. And agreed with (Sommerville et al. 1993, Dainty et al. 2000, Fielden et al. 2000, Agapiou 2002) they found that construction is well known as a male-dominated industry with a strong masculine culture. And this result agreed with Fielden et al. (2000) found that women in construction identified it difficult to fit in with male colleagues' work and social activities. Jayne et al., (1999) in line with this result women who seek entry into male-dominated cultures either have to act like men in order to be successful, or leave if they are not adaptable to the culture, or they can remain in the industry without behaving like men but maintaining unimportant positions. So, women Employment in this industry are faced up to several difficulties within this culture. Women consider themselves very much in a minority.

*"Male dominance on some engineering disciplines prevents women from choosing engineering"* was ranked in the last position of overall sample with RII (57.44), ranked in position number ten for Employment engineering women with RII (58.67), ranked in position number four in Unemployment engineering women with RII (72.00) and ranked in position number nine in female students with RII (30.00). Also P-value of this factor is .048 and is less than .05 so there is difference in the opinion of all category, the difference in opinion can appear in its ranked and RII of them, so it was ranked in position number eleven for overall sample and position ten for Employment engineering women, ranked in position number four for Unemployment engineering women, and ranked in position number nine of female students engineering women. This result means that the male dominated nature of engineering does not prevent women to choose civil engineer as career and that's result disagreed with Sommerville et al. 1993, Dainty et al. 2000, Fielden et al. 2000, Agapiou 2002 when they found construction is well known as a male-dominated industry with a strong masculine culture barrier women to choose this profession as career.

*"Men's preference than women to work effect the selection of the engineering profession"* P-value of this factor (.049) is less than .05 that's mean there is different in the opinion of each Employment, Unemployment and female students engineering women about this factor. Actually, in our country there is preference the man than women to take a chance in the job, but in some task they need women as part time for some task like design so she take little wages.

"Women respected in engineering" P-value of this factor in .020 less than .05 so there is difference in the opinion of each Employment, Unemployment and female students engineering women about this factor. The difference in opinion can appear in its ranked and RII of them, so it was ranked in position number seven for overall sample and Employment engineering women, and ranked in position number six for Unemployment engineering women, but ranked in first position of female students engineering women. In South Africa study done by Madikizela (2008) the study found that women on sites were not respected to same extent as men and those they were intimidated by the fact that there was more male Employment s in construction. According to him women workers were less likely to be organized than men, they were paid less on grounds of their purported secondary earner status, and they had less bargaining power because of the limitations placed on their labour-market options by their unpaid domestic responsibilities. Furthermore, even though there were more women entering the labour force they still remained confined to the lower paid more casual segments of the informal economy. The study also found that women in construction did not enjoy the same opportunities as men.

#### 4.3.2.2 Discipline: Architecture engineer

**Table (4.10) Rank and RII of Second Group: Male dominance on the engineering profession "Architecture engineer"**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Few women find a good jobs	80.00	1	80.00	1	84.00	1	76.00	2	0.667
The surrounding environment and the prevailing societal culture affecting the work of women in the field of engineering.	74.29	2	71.20	2	84.00	1	80.00	1	0.205
Discrimination reflect negative image when women choice her career.	72.00	3	68.80	4	84.00	1	76.00	2	0.185
Estimated women majoring in engineering.	71.43	4	70.40	3	80.00	2	68.00	4	0.439
Engineering women subjected to harassment in the workplace	68.57	5	68.80	4	72.00	3	64.00	5	0.793
Difficult to get women to the supervisory position affect the choice of profession in engineering.	67.43	6	63.20	6	80.00	2	76.00	2	0.086
Society's perception of women throughout the wife only makes it less likely for the selection of the engineering profession.	66.86	7	63.20	6	80.00	2	72.00	3	0.172
Men's preference than women to work effect the selection of the engineering profession.	64.00	8	63.20	6	64.00	4	68.00	4	0.907
Preference for men over women when hiring affect the choice of profession in engineering.	62.86	9	64.00	5	56.00	5	64.00	5	0.803
Male dominance on the senior administrative positions affect women's choice of profession in engineering.	56.57	10	52.80	8	56.00	5	76.00	2	0.107
Male dominance on some engineering disciplines prevents women from choosing engineering.	53.14	11	53.60	7	52.00	6	52.00	6	0.982
<b>All factors</b>	67.01		65.38		72.00		70.18		0.339



Table (4.10) indicated that "Few women find a good job" was ranked in first position for overall sample of engineering women with RII (80.00), in Employment engineering women with RII (80.00), and in Unemployment engineering women with RII (84.00), ranked in second position for female students with RII (76.00). This factor discussed in page number (15).

"The surrounding environment and the prevailing societal culture affecting the work of women in the field of engineering" was ranked in second position of overall sample engineering women with RII (74.29), in Employment engineering women with RII (71.20), ranked in first position of Unemployment engineering women with RII (84.00), and ranked in first position of female students engineer with RII (80.00). This factor discussed in page number (15).

"Male dominance on some engineering disciplines prevents women from choosing engineering" was ranked in the last position of overall sample with RII (53.14), ranked in position number seven for Employment engineering women with RII (53.60), ranked in position number six for Unemployment engineering women with RII (52.00) and ranked in position number six for female students with RII (52.00). This factor discussed in page number (15).

#### 4.3.2.3 Discipline: Communication engineer

**Table (4.11) Rank and RII of Second Group: Male dominance on the engineering profession "Communication engineer"**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Few women find a good jobs	84.83	1	82.73	1	95.00	1	86.67	1	0.403
The surrounding environment and the prevailing societal culture affecting the work of women in the field of engineering.	75.86	2	75.45	2	75.00	3	80.00	2	0.862
Discrimination reflect negative image when women choice her career.	73.79	3	73.64	3	80.00	2	66.67	4	0.486
Preference for men over women when hiring affect the choice of profession in engineering.	70.34	4	70.00	5	80.00	2	60.00	5	0.517
Engineering women subjected to harassment in the workplace	70.34	4	70.00	5	70.00	4	73.33	3	0.945
Estimated women majoring in engineering.	67.59	5	70.91	4	50.00	6	66.67	4	0.024
Men's preference than women to work effect the selection of the engineering profession.	66.90	6	67.27	6	75.00	3	53.33	6	0.353
Difficult to get women to the supervisory position affect the choice of profession in engineering.	65.52	7	65.45	7	70.00	4	60.00	5	0.804
Society's perception of women throughout the wife only makes it less likely for the selection of the engineering profession.	60.69	8	61.82	8	60.00	5	53.33	6	0.792
Male dominance on the senior administrative positions affect women's choice of profession in engineering.	60.00	9	59.09	9	75.00	3	46.67	7	0.187
Male dominance on some engineering disciplines prevents women from choosing engineering.	54.48	10	54.55	10	60.00	5	46.67	7	0.677
<b>All factors</b>	68.21		68.26		71.82		63.03		0.518

Table (4.11) indicated that *"Few women find a good job"* was ranked in first position for overall sample of engineering women with RII (84.83), in Employment engineering women with RII (82.73), in Unemployment engineering women with RII (95.00), and ranked in first position for female students with RII (86.67). This factor discussed in page number (15).

*"The surrounding environment and the prevailing societal culture affecting the work of women in the field of engineering"* was ranked in second position of overall sample engineering women with RII (75.86), in Employment engineering women with RII (75.45), and in female students engineer with RII (80.00) and ranked in third position of Unemployment engineering women with RII (75.00). This factor discussed in page number (15).

*"Male dominance on some engineering disciplines prevents women from choosing engineering"* was ranked in the last position of overall sample with RII (54.48), ranked in position number ten for Employment engineering women with RII (54.55), ranked in position number five for Unemployment engineering women with RII (60.00) and ranked in position number seven in female students with RII (46.67). This factor discussed in page number (15).

#### 4.3.2.4 Discipline: Computer engineer

**Table (4.12) Rank and RII of Second Group: Male dominance on the engineering profession "computer engineer"**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Few women find a good jobs	80.62	1	81.38	1	70.00	1	81.25	1	0.369
The surrounding environment and the prevailing societal culture affecting the work of women in the field of engineering.	75.38	2	73.79	2	70.00	1	77.50	2	0.480
Engineering women subjected to harassment in the workplace	69.54	3	66.90	6	65.00	2	72.50	3	0.348
Discrimination reflect negative image when women choice her career.	69.23	4	72.41	3	70.00	1	66.25	6	0.431
Estimated women majoring in engineering.	68.00	5	71.03	4	55.00	4	66.88	5	0.165
Difficult to get women to the supervisory position affect the choice of profession in engineering.	66.77	6	65.52	7	55.00	4	69.38	4	0.279
Preference for men over women when hiring affect the choice of profession in engineering.	64.00	7	73.79	2	55.00	4	56.25	9	0.003
Men's preference than women to work effect the selection of the engineering profession.	63.69	8	69.66	5	60.00	3	58.75	8	0.117
Society's perception of women throughout the wife only makes it less likely for the selection of the engineering profession.	62.46	9	60.69	8	55.00	4	65.00	7	0.598
Male dominance on the senior administrative positions affect women's choice of profession in engineering.	57.54	10	59.31	9	55.00	4	56.25	9	0.862
Male dominance on some engineering disciplines prevents women from choosing engineering.	46.46	11	51.72	10	50.00	4	41.25	10	0.149
<b>All factors</b>	65.79		67.84		60.00		64.66		0.291

Table (4.12) indicated that *"Few women find a good job"* was ranked in first position for overall sample of engineering women with RII (80.83), in Employment engineering women with RII (81.73), in Unemployment engineering women with RII (70.00), and in female students with RII (81.67). This factor discussed in page number (15).

*"The surrounding environment and the prevailing societal culture affecting the work of women in the field of engineering"* was ranked in second position of overall sample engineering women with RII (75.86), in Employment engineering women with RII (73.45), and in female students engineer with RII (77.00) and ranked in first position of Unemployment engineering women with RII (70.00). This factor discussed in page number (15).

*"Male dominance on some engineering disciplines prevents women from choosing engineering"* was ranked in the last position of overall sample with RII (46.48), ranked in position number ten for Employment engineering women with RII (51.55), ranked in position number four for Unemployment engineering women with RII (50.00) and ranked in position number ten for female students with RII (41.67). This factor discussed above.

*"Preference for men over women when hiring affect the choice of profession in engineering"* P-value of this factor (.003) is less than .05 that's mean there is different in the opinion of each Employment, Unemployment and female students engineering women about this factor.

#### 4.3.2.5 Discipline: Industry engineer

**Table (4.13) Rank and RII of Second Group: Male dominance on the engineering profession "industry engineer"**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Engineering women subjected to harassment in the workplace	77.14	1	75.00	2	40.00	2	100.00	1	0.012
Discrimination reflect negative image when women choice her career.	74.29	2	70.00	3	40.00	2	100.00	1	0.191
The surrounding environment and the prevailing societal culture affecting the work of women in the field of	74.29	2	70.00	3	40.00	2	100.00	1	0.018
Few women find a good jobs	74.29	2	80.00	1	40.00	2	80.00	2	.
Society's perception of women throughout the wife only makes it less likely for the selection of the engineering	68.57	3	60.00	4	40.00	2	100.00	1	0.042
Women respected in engineering.	65.71	4	75.00	2	80.00	1	40.00	4	0.019
Preference for men over women when hiring affect the choice of profession in engineering.	62.86	5	50.00	5	40.00	2	100.00	1	0.054
Difficult to get women to the supervisory position affect the choice of profession in engineering.	62.86	5	50.00	5	40.00	2	100.00	1	0.008
Male dominance on the senior administrative positions affect women's choice of profession in engineering.	57.14	6	50.00	5	40.00	2	80.00	2	0.191
Men's preference than women to work effect the selection of the engineering profession.	54.29	7	45.00	6	40.00	2	80.00	2	0.019
Male dominance on some engineering disciplines prevents women from choosing engineering.	51.43	8	50.00	5	40.00	2	60.00	3	0.652
<b>All factors</b>	65.71		61.36		43.64		85.45		0.015

Table (4.13) indicated that *"Engineering women subjected to harassment in the workplace"* was ranked in the first position of overall sample with RII (77.14) and in

female students sample with RII (100.00), and ranked in second position in Employment engineering women with RII (75.00) and in Unemployment engineering women with RII (40.00). In my opinion, women are subjected to sex discrimination while entering to male-dominated work fields such as industry. Discrimination against Female Engineers Attitudes prevalent in the industry towards women led to the following: Few women were usually recruited as employers thought that the management of their homes would prevent their effective performance on the job, and discrimination on promotion, so this result one of the influences for not choosing a career in engineering industry. This result agreed with Perreault (1992) when found and discuss that women must learn how to effectively address and cope with aggression, foul language, sexual harassment, intimidation and rejection in the construction industry. Furthermore, research shows that women are faced with sexual harassment at many construction sites and this does not contribute to their health and safety on sites. In South Africa study found that 7.7% that discrimination was one of the influences for not choosing a career with a further 3.3% reporting sexual harassment by males as an influence.

*"Discrimination reflect negative image when women choice her career"* was ranked in second position in overall sample with RII (74.29), and in second position for Unemployment engineering women with RII (40.00), ranked in third position for Employment engineering women with RII (70.00), and ranked in first position in female students with RII (100.00). In my opinion, there is discrimination in the sense that women are often barred or discouraged from entering certain occupations. For the most part of our history women have been notably absent from the sciences and engineering. When women have the same educational qualifications, time on the job and occupational attitudes, women are less likely than men to achieve high-status positions or to move into management, also female paid less than men for the same job. This result agreed with Kumbhar (2011) who stated that wage discrimination is the common phenomena in Indian economy; females are paid less than male.

*"Male dominance on some engineering disciplines prevents women from choosing engineering"* was ranked in the last position in overall sample with RII (51.48), ranked in position number five for Employment engineering women with RII (50.00), ranked in second position in Unemployment engineering women with RII (40.00) and ranked in third position in female students with RII (60.00). This factor discussed in page number (20).

*"The surrounding environment and the prevailing societal culture affecting the work of women in the field of engineering"* was ranked in second position in overall sample engineering women with RII (74.86), ranked in third position in Employment engineering women with RII (70.45), ranked in second position of Unemployment engineering women with RII (40.00), and ranked in first position in female students with RII (100.00). This factor discussed in page number (20).

*"Few women find a good job"* was ranked in second position in overall sample of engineering women with RII (74.83), in Unemployment engineering women with RII (40.00) and in female students with RII (80.67) and ranked in the first position for Employment engineering women with RII (80.73). This factor discussed in page number (20).

### 4.3.2.6 Comparison for each discipline

Table (4.14) comparison for each discipline related to the second group "Male dominance on the engineering profession"

Ranked	Civil	RII	Architecture	RII	Communication	RII	Computer	RII	Industry	RII
1	Few women find a good jobs	81.54	Few women find a good jobs	80.00	Few women find a good jobs	84.83	Few women find a good jobs	80.62	Engineering women subjected to harassment in the workplace	77.14
2	The surrounding environment and the prevailing societal culture affecting the work of women in the field of engineering.	74.36	The surrounding environment and the prevailing societal culture affecting the work of women in the field of engineering.	74.29	The surrounding environment and the prevailing societal culture affecting the work of women in the field of engineering.	75.86	The surrounding environment and the prevailing societal culture affecting the work of women in the field of engineering.	75.38	Discrimination reflect negative image when women choice her career.	74.29
3	Discrimination reflect negative image when women choice her career.	73.85	Discrimination reflect negative image when women choice her career.	72.00	Discrimination reflect negative image when women choice her career.	73.79	Engineering women subjected to harassment in the workplace	69.54	The surrounding environment and the prevailing societal culture affecting the work of women in the field of engineering.	74.29
4	Society's perception of women throughout the wife only makes it less likely for the selection of the engineering profession.	73.33	Estimated women majoring in engineering.	71.43	Preference for men over women when hiring affect the choice of profession in engineering.	70.34	Discrimination reflect negative image when women choice her career.	69.23	Few women find a good jobs	74.29
5	Men's preference than women to work effect the selection of the engineering profession.	71.28	Engineering women subjected to harassment in the workplace	68.57	Engineering women subjected to harassment in the workplace	70.34	Estimated women majoring in engineering.	68.00	Society's perception of women throughout the wife only makes it less likely for the selection of the engineering profession.	68.57
6	Engineering women subjected to harassment in the workplace	70.26	Difficult to get women to the supervisory position affect the choice of profession in engineering.	67.43	Estimated women majoring in engineering.	67.59	Difficult to get women to the supervisory position affect the choice of profession in engineering.	66.77	Women respected in engineering.	65.71
7	Women respected in engineering.	67.69	Society's perception of women throughout the wife only makes it less likely for the selection of the engineering profession.	66.86	Men's preference than women to work effect the selection of the engineering profession.	66.90	Preference for men over women when hiring affect the choice of profession in engineering.	64.00	Preference for men over women when hiring affect the choice of profession in engineering.	62.86
8	Preference for men over women when hiring affect the choice of	64.62	Men's preference than women to work effect the	64.00	Difficult to get women to the supervisory position affect the	65.52	Men's preference than women to work effect the	63.69	Difficult to get women to the supervisory position	62.86

**Table (4.14) comparison for each discipline related to the second group "Male dominance on the engineering profession"**

Ranked	Civil	RII	Architecture	RII	Communication	RII	Computer	RII	Industry	RII
	profession in engineering.		selection of the engineering profession.		choice of profession in engineering.		selection of the engineering profession.		affect the choice of profession in engineering.	
9	Difficult to get women to the supervisory position affect the choice of profession in engineering.	62.56	Preference for men over women when hiring affect the choice of profession in engineering.	62.86	Society's perception of women throughout the wife only makes it less likely for the selection of the engineering profession.	60.69	Society's perception of women throughout the wife only makes it less likely for the selection of the engineering profession.	62.46	Male dominance on the senior administrative positions affect women's choice of profession in engineering.	57.14
10	Male dominance on the senior administrative positions affect women's choice of profession in engineering.	58.97	Male dominance on the senior administrative positions affect women's choice of profession in engineering.	56.57	Male dominance on the senior administrative positions affect women's choice of profession in engineering.	60.00	Male dominance on the senior administrative positions affect women's choice of profession in engineering.	57.54	Men's preference than women to work effect the selection of the engineering profession.	54.29
11	Male dominance on some engineering disciplines prevents women from choosing engineering.	57.44	Male dominance on some engineering disciplines prevents women from choosing engineering.	53.14	Male dominance on some engineering disciplines prevents women from choosing engineering.	54.48	Male dominance on some engineering disciplines prevents women from choosing engineering.	46.46	Male dominance on some engineering disciplines prevents women from choosing engineering.	51.43

Table (4.14) indicated that *"Few women find a good job"* was ranked in the first position for all discipline civil, architecture, communication, and computer, except industry ranked in the second position.

*"The surrounding environment and the prevailing societal culture affecting the work of women in the field of engineering"* was ranked in the second position for all discipline in this research civil, architecture, communication, computer, and industry engineer.

*"Discrimination reflect negative image when women choice her career"* was ranked in the third position for each of civil, architecture, communication engineer, also in second position for industry engineer, and in position four for computer engineer.

*"Society's perception of women throughout the wife only makes it less likely for the selection of the engineering profession"* was ranked in position number four for civil engineer, also in third position for industry engineer, but in position number eight for each computer and communication engineer, also in position number seven for architect. From this result notes that society perception more effect civil and industry to not choose this discipline as career than other discipline of engineer.

*"Men's preference than women to work effect the selection of the engineering profession"* was ranked in position number five for civil engineer, position number eight for architect, position number six for communication engineer, and position number seven for each computer and industry engineer. This factor effect civil and communication engineering women rather than other discipline and this factor have negative effect also effect computer and industry by same amount.

*"Engineering women subjected to harassment in the workplace"* was ranked in first position in industry engineer that's mean the most discipline in engineer women subjected to harassment and that's have negative effect women when she choose her career in industry, also ranked in position number three for computer engineer, ranked in position number for in communication engineer, ranked in position five for architect engineer and in position number six for civil engineer in effect to choice different engineering career as their career.

*"Male dominance on some engineering disciplines prevents women from choosing engineering"* was ranked in the last position for all engineering discipline, that's mean that factor have low effect women when she choice her career in engineering.

#### 4.3.2.7 Second hypotheses tested in this research are

- Null hypothesis (H<sub>0</sub>): Male dominance of some engineering disciplines is a primary negative factor that discourages women from embarking on careers in engineering (at .05 levels).
- Alternative hypothesis (H<sub>1</sub>): Male dominance of some engineering disciplines is a primary negative factor that discourages women from embarking on careers in engineering (at .05 levels).

Table 4.15 indicated that P-value (0.504) > 0.05 for overall sample as whole, but there are one factor inside this group have P-value < 0.05. Thus, null hypothesis is rejected,

alternative hypothesis is substantiated for the phase as whole, and null hypothesis is substantiated for some factors.

**Table (4.15) Male dominance on women Employment in engineering**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Few women find a good jobs	81.14	1	81.64	1	80.00	1	80.43	1	0.866
The surrounding environment and the prevailing societal culture affecting the work of women in the field of engineering.	74.97	2	73.64	2	75.79	3	77.83	2	0.314
Discrimination reflect negative image when women choice her career.	71.77	3	72.18	3	76.84	2	68.70	5	0.203
Engineering women subjected to harassment in the workplace	69.94	4	69.27	5	68.42	5	72.17	3	0.575
Estimated women majoring in engineering.	68.46	5	70.18	4	61.05	9	67.39	6	0.073
Society's perception of women throughout the wife only makes it less likely for the selection of the engineering profession.	65.71	6	64.73	8	68.42	5	66.96	7	0.708
Difficult to get women to the supervisory position affect the choice of profession in engineering.	65.60	7	62.91	9	71.58	4	69.57	4	0.055
Men's preference than women to work effect the selection of the engineering profession.	65.60	7	68.36	6	64.21	7	59.57	8	0.052
Preference for men over women when hiring affect the choice of profession in engineering.	64.91	8	67.82	7	65.26	6	57.83	9	0.051
Male dominance on the senior administrative positions affect women's choice of profession in engineering.	58.06	9	57.64	10	63.16	8	56.96	10	0.591
Male dominance on some engineering disciplines prevents women from choosing engineering.	51.77	10	54.55	11	57.89	10	42.61	11	0.004
<b>All factors</b>	67.09		67.54		68.42		65.45		0.504

As mentioned above that the null hypothesis is substantiated for some factors, this partially substantiated from the significant difference (at level 0.05) between the opinions of Employment, Unemployment and female students engineering women in different discipline. This factor is:

P-value (0.004) < 0.05 for factor "*Male dominance on some engineering disciplines was prevents women from choosing engineering*". So there is significant difference between the opinions of Employment, Unemployment and female students engineering women in different discipline.



### 4.3.3 Third Group: The personal qualities of an engineer engineering women

#### 4.3.3.1 Discipline: Civil engineering women

Table (4.16) show the relative importance indices and ranks of factors of the third group " The personal qualities of an engineer engineering women " this group contains 7 factors.

**Table (4.16) Rank and RII of Third Group: The personal qualities of an engineer engineering women "Civil engineer"**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Women's have active role in the engineering work.	85.13	1	88.67	1	72.00	4	75.00	3	0.014
Women can build a successful career in engineering.	84.62	2	84.00	4	88.00	1	85.00	1	0.811
Women can contribute and add new in engineering through her work.	84.10	3	84.67	2	84.00	2	80.00	2	0.785
There is a need for engineering disciplines to provide more knowledge about the opportunity to employ women.	82.05	4	84.67	2	80.00	3	65.00	4	0.057
Women expect to have a successful career in engineering because they have enough knowledge for this specialization.	77.44	5	78.67	5	80.00	3	65.00	4	0.263
Personal protective equipment is not suitable for women.	58.97	6	60.67	6	48.00	6	60.00	5	0.366
The small number of Employment women in our society has led to fewer and inefficient kindergarten "nursery".	55.90	7	56.67	7	52.00	5	55.00	6	0.892
All factors	75.46		76.86		72.00		69.29		0.215

Table (4.16) indicated that "Women's have active role in the engineering work" was ranked in first position in overall sample with RII (85.13) and in Employment engineering women with RII (88.67), ranked in position number four in Unemployment engineering women with RII (72.00) and ranked in third position in female students with RII (75.00). P-value is (.014) less than .05 so there is different between the opinion of Employment, Unemployment and female students engineering women. This result agreed with Matope (2007) that weakness of female and their short-comings in physical fitness might lead them into designing machinery to overcome this weakness. Since they were observed to be intellectually competent, they might even invent new devices to enable them to perform better and efficiently in engineering jobs. This would ultimately lead to an improvement in the available engineering technology.

"Women can build a successful career in engineering" was ranked in second position in overall sample with RII (84.62), ranked in the first position in Unemployment engineering women and female students engineer with RII (88.00), (85.00) respectively, and in position number four for Employment engineering women with RII (84.62). This ranked mean that Employment engineers are less to that women can build successful career in engineer, and in South Africa study done by Madikizela (2008) found that women currently employed in construction felt strongly that women could build successful careers in and contribute to the construction industry. The ranking of

these issues also suggested that women felt strongly that females had something to contribute to the industry with their education.

*"The small number of Employment women in our society has led to fewer and inefficient kindergarten "nursery"* was ranked in the last factor that effect women when choose engineering as career so was ranked in position number seven for overall sample with RII (55.90), also in position number seven for Employment engineer with RII (56.67), also ranked in position five for Unemployment engineer with RII (52.00), and ranked in position six for female students sample with RII (55.00).

#### 4.3.3.2 Discipline: Architecture engineering women

**Table (4.17) Rank and RII of Third Group: The personal qualities of an engineer engineering women "Architecture engineer"**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
There is a need for engineering disciplines to provide more knowledge about the opportunity to employ women.	84.57	1	84.00	1	92.00	1	80.00	2	0.132
Women can contribute and add new in engineering through her work.	83.43	2	83.20	2	84.00	3	84.00	1	0.974
Women's have active role in the engineering work.	82.29	3	84.00	1	72.00	5	84.00	1	0.144
Women can build a successful career in engineering.	82.29	3	82.40	3	88.00	2	76.00	3	0.429
Women expect to have a successful career in engineering because they have enough knowledge For this specialization.	77.14	4	79.20	4	76.00	4	68.00	4	0.375
Personal protective equipment is not suitable for women.	60.57	5	60.00	5	64.00	6	60.00	5	0.928
The small number of Employment women in our society has led to fewer and inefficient kindergarten "nursery".	53.71	6	52.80	6	64.00	6	48.00	6	0.394
<b>All factors</b>	74.86		75.09		77.14		71.43		0.448

Table (4.17) indicated that *"There is a need for engineering disciplines to provide more knowledge about the opportunity to employ women"* was ranked in the first position for overall sample, Employment engineering women and Unemployment engineering women with RII (84.57), RII (84.00), and RII (92.00) respectively and ranked in second position for female students. This result mean there is general lack of knowledge about engineering career and it opportunities so that result agreed with the result of south Africa done by Madikizela (2008) who stated that there was a general lack of knowledge of the industry itself as well as career opportunities that the industry offered. Further, women from communities where women were educated were likely to be more motivated to pursue further studies.

*"Women can contribute and add new in engineering through her work"* was ranked in second position for overall sample and employment engineering women with RII (83.43), RII (83.20), ranked in third position for Unemployment engineering women with RII (84.00) and ranked in first position for female students with RII (84.00). This result agreed with South Africa study done by Madikizela (2008) who found that

women currently employed in construction felt strongly that women could build successful careers in and contribute to the construction industry. The ranking of these issues also suggested that women felt strongly that females had something to contribute to the industry with their education.

*"The small number of Employment women in our society has led to fewer and inefficient kindergarten "nursery"* was ranked in the last position for all categories of engineer Employment; Unemployment and female student's position number six. This factor was discussed in page number 25.

#### 4.3.3.3 Discipline: Communication engineering women

**Table (4.18) Rank and RII of Third Group: The personal qualities of an engineer engineering women "communication engineer"**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
There is a need for engineering disciplines to provide more knowledge about the opportunity to employ women.	80.69	1	80.00	4	85.00	1	80.00	1	0.773
Women's have active role in the engineering work.	80.00	2	83.64	1	75.00	3	60.00	3	0.024
Women can contribute and add new in engineering through her work.	79.31	3	80.91	3	75.00	3	73.33	2	0.410
Women can build a successful career in engineering.	77.93	4	81.82	2	80.00	2	46.67	4	0.000
Women expect to have a successful career in engineering because they have enough knowledge For this specialization.	73.10	5	79.09	5	60.00	5	46.67	4	0.001
Personal protective equipment is not suitable for women.	62.07	6	62.73	6	60.00	5	60.00	3	0.945
The small number of Employment women in our society has led to fewer and inefficient kindergarten "nursery".	56.55	7	54.55	7	65.00	4	60.00	3	0.540
<b>All factors</b>	<b>72.81</b>		<b>74.68</b>		<b>71.43</b>		<b>60.95</b>		<b>0.004</b>

Table (4.18) indicated that *"There is a need for engineering disciplines to provide more knowledge about the opportunity to employ women"* was ranked in the first position for overall sample, Unemployment engineering women and female students with RII (80.69), RII (85.00), and RII (80.00) respectively and in position number four in Employment engineering women with RII (80.00). This factor discussed in page number (24).

*"Women's have active role in the engineering work"* was ranked in second position for overall sample with RII (80.00), ranked in first position for Employment engineering women with RII (83.00), ranked in third position for Unemployment engineering women and female students with RII (75.00), RII (60.00) respectively. P-value of this factor is .024 is less than .05 so there is different in their opinion of all category of this study. This factor discussed in page number (24).

*"The small number of Employment women in our society has led to fewer and inefficient kindergarten "nursery"* was ranked in the last position for all categories of engineer

Employment; Unemployment engineering women and female students. This factor discussed in page number (24).

"Women can build a successful career in engineering" P-value is 0.000 less than .05 for this factor that's mean there is different in their opinion of all category of this study. This factor discussed in page number (24).

"Women expect to have a successful career in engineering because they have enough knowledge for this specialization" P-value is 0.001 less than .05 for this factor that's mean there is different in their opinion of all category of this study. This agreed with Fielden et al. (2000), Madikizela (2008) also with result of Layne (2009) study the biggest problem limiting the enrollment of women in engineering is the general public lack of knowledge about engineering; also he cited that the American women's movement focused on the sciences rather than on engineering because the latter lacked cultural authority.

#### 4.3.3.4 Discipline: Computer engineering women

**Table (4.19) Rank and RII of Third Group: The personal qualities of an engineer engineering women "computer engineer"**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Women can contribute and add new in engineering through her work.	76.00	1	78.62	3	70.00	2	74.38	1	0.453
Women's have active role in the engineering work.	74.77	2	80.00	2	70.00	2	70.63	2	0.131
There is a need for engineering disciplines to provide more knowledge about the opportunity to employ women.	73.54	3	76.55	4	75.00	1	70.63	2	0.427
Women can build a successful career in engineering.	73.23	4	83.45	1	70.00	2	64.38	3	0.001
Women expect to have a successful career in engineering because they have enough knowledge for this specialization.	66.15	5	76.55	4	60.00	3	57.50	5	0.000
Personal protective equipment is not suitable for women.	62.46	6	64.14	5	60.00	3	61.25	4	0.823
The small number of Employment women in our society has led to fewer and inefficient kindergarten "nursery".	54.15	7	57.93	6	55.00	4	50.63	6	0.313
<b>All factors</b>	68.62		73.89		65.71		64.20		0.004

Table (4.19) indicated that "Women can contribute and add new in engineering through her work" was ranked in the first position of overall sample with RII (76.00), and in female students with RII (74.38), ranked in second position for Unemployment engineering women with RII (70.00), and ranked in third position for Employment engineering women. This factor discuss in page (24).

"Women's have active role in the engineering work" was ranked in second position for all category overall sample, Employment, Unemployment engineering women, and female students sample. This factor discuss in page (24).

"The small number of Employment women in our society has led to fewer and inefficient kindergarten "nursery" was ranked in last position for all category overall sample, Employment, Unemployment engineering women, and female students' sample. This factor discuss in page (24).

"Women can build a successful career in engineering" P-value of this factor .001 less than .05 so there is different opinion of this factor of all category overall sample, , Employment , Unemployment engineering women, and female students sample. This factor discuss in page (24).

"Women expect to have a successful career in engineering because they have enough knowledge for this specialization" P-value of this factor .000 less than .05 so there is different opinion of this factor of all category overall sample, Employment, Unemployment engineering women, and female student's sample. This factor discuss in page (24).

#### 4.3.3.5 Discipline: Industry engineering women

**Table (4.20) Rank and RII of Third Group: The personal qualities of an engineer engineering women" industry engineer**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Women can contribute and add new in engineering through her work.	88.57	1	90.00	2	100.00	1	80.00	1	0.340
Women can build a successful career in engineering.	88.57	1	90.00	2	100.00	1	80.00	1	0.340
There is a need for engineering disciplines to provide more knowledge about the opportunity to employ women.	88.57	1	90.00	2	100.00	1	80.00	1	0.340
Women's have active role in the engineering work.	80.00	2	95.00	1	20.00	4	80.00	1	0.004
Women expect to have a successful career in engineering because they have enough knowledge for this specialization.	74.29	3	85.00	3	100.00	1	40.00	3	0.058
Personal protective equipment is not suitable for women.	60.00	4	55.00	5	80.00	2	60.00	2	0.712
The small number of Employment women in our society has led to fewer and inefficient kindergarten "nursery".	57.14	5	70.00	4	40.00	3	40.00	4	0.042
<b>All factors</b>	<b>76.73</b>		<b>82.14</b>		<b>77.14</b>		<b>65.71</b>		<b>0.027</b>

From table (4.20) "Women can contribute and add new in engineering through her work" was ranked in the first position in overall sample, Unemployment engineering women and female students with RII (88.57), RII (100.00), RII (80.00) also ranked second position in Employment engineering women with RII (80.00). This factor discuss in page (24).

"Women can build a successful career in engineering" was ranked in the first position in overall sample, Unemployment engineering women and female students with RII (88.57), RII (100.00), and RII (80.00) and ranked second position for Employment engineering women with RII (80.00). This factor discuss in page (24).

*"There is a need for engineering disciplines to provide more knowledge about the opportunity to employ women"* was ranked in the first position in overall sample, Unemployment engineering women and female students with RII (88.57), RII (100.00), and RII (80.00) also ranked second position for Employment engineering women with RII (80.00). This factor discuss in page (24).

*"Women's have active role in the engineering work"* was ranked in the second position in overall sample with RII (80.00), ranked in the first position in Employment engineering women and female students with RII (95.00), RII (80.00) and ranked in position number four for Unemployment engineering women with RII (20.00). P-value of this factor is .004 less than .05 so there is different in opinion of all category of this study. This factor discuss in page (24).

*"The small number of Employment women in our society has led to fewer and inefficient kindergarten "nursery"* was ranked in last position all category overall sample, Employment, Unemployment engineering women and female students sample. P-value of this factor .042 less than .05 so there is different opinion of this factor of all category overall sample, employment, unemployment, and female students sample. This factor discuss in page (24).

#### **4.3.3.6 Comparison for each discipline**

From table (4.21) *"Women's have active role in the engineering work"* was ranked in the first position for civil engineer, ranked in third position for architect engineering women and in second position for communication, computer and industry engineer, this difference in ranked may return to the neuter of the work in each discipline.

*"Women can build a successful career in engineering"* was ranked in second position for civil engineer, ranked in third position for architect, ranked in position number four for each computer and communication, also ranked in the first position for industry engineering women.

*"Women can contribute and add new in engineering through her work"* was ranked in third position for civil and communication engineer ranked in second position for architect engineer and ranked in the first position for computer and industry engineer.

*"There is a need for engineering disciplines to provide more knowledge about the opportunity to employ women"* was ranked in position number four for civil engineer, also ranked in first position for each architect, communication and industry engineer, also ranked in third position for computer engineer. May this difference return to blur image about the role of women and the task that women tasked.

*"Women expect to have a successful career in engineering because they have enough knowledge for this specialization"* was ranked in position number five for each civil, communication, computer engineering women, also ranked in fourth position for architect and ranked in third position for industry engineer.

*"Personal protective equipment is not suitable for women"* was ranked in position number six for each civil, communication, computer engineering women, also ranked in position number five for architect and ranked in fourth position for industry engineer.

*"The small number of Employment women in our society has led to fewer and inefficient kindergarten "nursery" was ranked in position number seven for each civil, communication, computer engineering women, also ranked in position number six for architect and ranked in position number five for industry engineer.*

**Table (4.21) Comparison for each discipline related to the third group "The personal qualities of an engineer engineering women"**

Ranked	Civil	RII	Architecture	RII	Communication	RII	Computer	RII	Industry	RII
1	Women's have active role in the engineering work.	85.13	There is a need for engineering disciplines to provide more knowledge about the opportunity to employ women.	84.57	There is a need for engineering disciplines to provide more knowledge about the opportunity to employ women.	80.69	Women can contribute and add new in engineering through her work.	76.00	Women can contribute and add new in engineering through her work.	88.57
2	Women can build a successful career in engineering.	84.62	Women can contribute and add new in engineering through her work.	83.43	Women's have active role in the engineering work.	80.00	Women's have active role in the engineering work.	74.77	Women can build a successful career in engineering.	88.57
3	Women can contribute and add new in engineering through her work.	84.10	Women's have active role in the engineering work.	82.29	Women can contribute and add new in engineering through her work.	79.31	There is a need for engineering disciplines to provide more knowledge about the opportunity to employ women.	73.54	There is a need for engineering disciplines to provide more knowledge about the opportunity to employ women.	88.57
4	There is a need for engineering disciplines to provide more knowledge about the opportunity to employ women.	82.05	Women can build a successful career in engineering.	82.29	Women can build a successful career in engineering.	77.93	Women can build a successful career in engineering.	73.23	Women's have active role in the engineering work.	80.00
5	Women expect to have a successful career in engineering because they have enough knowledge for this specialization.	77.44	Women expect to have a successful career in engineering because they have enough knowledge For this specialization.	77.14	Women expect to have a successful career in engineering because they have enough knowledge For this specialization.	73.10	Women expect to have a successful career in engineering because they have enough knowledge for this specialization.	66.15	Women expect to have a successful career in engineering because they have enough knowledge for this specialization.	74.29
6	Personal protective equipment is not suitable for women.	58.97	Personal protective equipment is not suitable for women.	60.57	Personal protective equipment is not suitable for women.	62.07	Personal protective equipment is not suitable for women.	62.46	Personal protective equipment is not suitable for women.	60.00
7	The small number of Employment women in our society has led to fewer and inefficient kindergarten "nursery".	55.90	The small number of Employment women in our society has led to fewer and inefficient kindergarten "nursery".	53.71	The small number of Employment women in our society has led to fewer and inefficient kindergarten "nursery".	56.55	The small number of Employment women in our society has led to fewer and inefficient kindergarten "nursery".	54.15	The small number of Employment women in our society has led to fewer and inefficient kindergarten "nursery".	57.14



#### 4.3.4 Fourth Group: Social value and prestige related with engineer

##### 4.3.4.1 Discipline: Civil engineering women

Table (4.22) show the relative importance indices and ranks of factors of the fourth group " Social value and prestige related with engineer " this group contains 9 factors.

**Table (4.22) Rank and RII of fourth Group: Social value and prestige related with engineer "civil engineer"**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Women fit administrative work more than work at the sites.	77.95	1	80.00	1	64.00	4	80.00	2	0.250
From my experience, I think that the traditional role of women as wives and mother affect the accepted work in the field.	74.87	2	76.00	2	64.00	4	80.00	2	0.442
Customs and traditions in a community affect actions in the field of employment.	73.85	3	74.00	3	76.00	2	70.00	4	0.884
Some things are related to the nature of women suitable for work in the field of engineering.	68.21	4	69.33	4	56.00	5	75.00	3	0.339
My dream to be engineering leads me to choose this profession.	67.18	5	65.33	6	64.00	4	85.00	1	0.272
Provide job opportunities in the field of engineering impact on the selected engineering discipline.	66.15	6	68.00	5	64.00	4	55.00	6	0.509
Prestige of engineering career leads me to choose this profession.	65.13	7	64.00	7	80.00	1	55.00	6	0.270
Social level of engineering leads me to choose this profession.	64.62	8	62.67	9	76.00	2	65.00	5	0.474
Confined my optional for the engineering profession to obtain high average in high school.	61.54	9	63.33	8	72.00	3	35.00	7	0.082
<b>All factors</b>	<b>68.83</b>		<b>69.19</b>		<b>68.44</b>		<b>66.67</b>		<b>0.931</b>

Table (4.22) indicated that "Women fit administrative work more than work at the sites" was ranked in the first position in overall sample with RII (77.95), and in Employment engineering women with RII (80.00), ranked in position four in Unemployment engineering women with RII (64.00), and ranked in second position in female students RII (80.00). This result is agreed with the result of Arslan and Kivrak (2004) who found that female civil engineers stated that they prefer to work in technical office rather than construction sites. Also this result agreed with the result found in South Africa by Madikizela (2008) that women were more suited to administrative than productive functions on site.

"From my experience, I think that the traditional role of women as wives and mother affect the accepted work in the field" was ranked in second position in overall sample with RII (74.87), in Employment engineering women with RII (76.00) and in female students with RII (80.00) and ranked in position number four in Unemployment engineering women. This result agreed with the result found in south Africa by Madikizela (2008) that female students held more strongly that the historical roles that women and men played in society

made it difficult for men to accept females. These findings suggest that males held more strongly than females that their historical traditional roles could have an influence on their career choices in construction.

"Confined my optional for the engineering profession on obtain high average in high school" was ranked in last position of overall sample with RII (61.54), ranked in position number eight in Employment engineering women with RII (63.33), ranked in third position of Unemployment engineering women with RII (72.00), and ranked in position number seven in female students with RII (35.00). In fact, in our country most female students male or female choose their career depend on their average in high school.

#### 4.3.4.2 Discipline: Architecture engineering women

**Table (4.23) Rank and RII of fourth Group: Social value and prestige related with engineer "Architecture engineer"**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Women fit administrative work more than work at the sites.	78.29	1	80.00	1	76.00	2	72.00	4	0.708
From my experience, I think that the traditional role of women as wives and mother affect the accepted work in the field.	77.14	2	75.20	3	80.00	1	84.00	1	0.436
Customs and traditions in a community affect my actions in the field of employment.	76.00	3	74.40	4	80.00	1	80.00	2	0.657
My dream to be engineering leads me to choice this profession.	74.29	4	76.80	2	80.00	1	56.00	7	0.100
Some things are related to the nature of women not suitable for work in the field of engineering.	65.71	5	63.20	5	76.00	2	68.00	5	0.308
Social level of engineering leads me to choice this profession.	63.43	6	60.00	6	68.00	3	76.00	3	0.242
Confined my optional for the engineering profession on obtain high average in high school.	60.57	7	59.20	7	60.00	5	68.00	5	0.774
Prestige of engineering career leads me to choice this profession.	57.71	8	55.20	8	56.00	6	72.00	4	0.266
Provide job opportunities in the field of engineering impact on the selected engineering discipline.	53.71	9	50.40	9	64.00	4	60.00	6	0.405
<b>All factors</b>	<b>67.43</b>		<b>66.04</b>		<b>71.11</b>		<b>70.67</b>		<b>0.419</b>

Table (4.23) indicated that "Women fit administrative work more than work at the sites" was ranked in the first position in overall sample with RII (78.29) and in Employment engineering women with RII (80.00), ranked in second position in Unemployment engineering women with RII (76.00), and ranked in position number four in female students with RII (72.00). This factor discuss in page number (32).

"From my experience, I think that the traditional role of women as wives and mother affects the accepted work in the field" was ranked in second position in overall sample with RII (77.14), ranked in third position for Employment engineering women, and ranked in first position for each Unemployment engineering women and female students. This factor discussed in page number (32).

"Provide job opportunities in the field of engineering impact on the selected engineering discipline" was ranked in last position of overall sample with RII (53.71), in Employment engineering women with RII (50.40), ranked in position four in Unemployment engineering women with RII (64.00), and ranked in position six in female students with RII (60.00). This result disagreed with the result of Jones and Larke (2005) their study found that perception of having limited job opportunities led respondents to choose other careers. Also disagreed with the result Azizzadeh et al. (2003) and Ososki et al. (2006) study. In 2012, In the Gaza Strip Bulletin Engineers Association disclaimer to high school female students to think carefully before studying engineering for lack of employment opportunities, and increase the number of engineers don't work in the Gaza Strip and in the same disclaimer has published the number of engineers who are Employment and the number of engineers don't work, in a reference to the importance of finding jobs after studying. This indicated the importance of this factor "job opportunities and societal need" on choosing the career.

#### 4.3.4.3 Discipline: Communication engineering women

**Table (4.24) Rank and RII of fourth Group: Social value and prestige related with engineer "communication engineer"**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Women fit administrative work more than work at the sites.	72.41	1	75.45	1	55.00	5	73.33	1	0.226
From my experience, I think that the traditional role of women as wives and mother affect accepted work in the field.	71.03	2	72.73	2	60.00	4	73.33	1	0.524
My dream to be engineering leads me to choose this profession.	69.66	3	70.00	3	65.00	3	73.33	1	0.902
Customs and traditions in a community affect actions in the field of employment.	66.90	4	68.18	4	65.00	3	60.00	3	0.734
Some things are related to the nature of work not suitable for work in the field of engineering.	65.52	5	62.73	5	85.00	1	60.00	3	0.159
Confined my optional for the engineering profession on obtain high average in high school.	62.76	6	60.00	6	70.00	2	73.33	1	0.608
Social level of engineering leads me to choose this profession.	62.76	7	62.73	5	70.00	2	53.33	4	0.536
Prestige of engineering career leads me to choose this profession.	57.24	8	54.55	7	70.00	2	60.00	3	0.329
Provide job opportunities in the field of engineering impact on the selected engineering discipline.	54.48	9	51.82	8	60.00	4	66.67	2	0.358
<b>All factors</b>	64.75		64.24		66.67		65.93		0.877

Table (4.24) indicated that "Women fit administrative work more than work at the sites" was ranked in the first position for overall sample. This factor discussed in page number (32).

"From my experience, I think that the traditional role of women as wives and mother affect the accepted work in the field" was ranked in second position. This factor discussed in page number (32).

"Provide job opportunities in the field of engineering impact on the selected engineering discipline" was ranked in last position for overall position. This factor discussed in page number (32).

#### 4.3.4.4 Discipline: Computer engineering women

**Table (4.25) Rank and RII of fourth Group: Social value and prestige related with engineer "computer engineer"**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Customs and traditions in a community affect actions in the field of employment.	71.08	1	77.24	1	70.00	1	65.63	5	0.081
From my experience, I think that the traditional of women as wives and mother affect the accepted work in the field.	69.23	2	62.76	5	55.00	5	76.88	1	0.031
Women fit administrative work more than work at sites.	69.23	2	73.79	2	60.00	3	66.25	4	0.260
My dream to be engineering leads me to choice profession.	68.31	3	70.34	3	65.00	2	66.88	3	0.780
Some things are related to the nature of women suitable for work in the field of engineering.	65.23	4	62.07	6	70.00	1	67.50	2	0.381
Provide job opportunities in the field of engineering impact on the selected engineering discipline.	60.00	5	64.14	4	55.00	4	56.88	8	0.349
Social level of engineering leads me to choice profession.	58.77	6	57.93	7	55.00	5	60.00	7	0.882
Prestige of engineering career leads me to choice profession.	58.15	7	56.55	8	50.00	5	60.63	6	0.547
Confined my optional for the engineering profession on obtain high average in high school.	56.62	8	57.93	7	55.00	5	55.63	9	0.926
<b>All factors</b>	<b>64.07</b>		<b>64.75</b>		<b>59.44</b>		<b>64.03</b>		<b>0.689</b>

Table (4.25) indicated that "Customs and traditions in a community affect my actions in the field of employment" was ranked in the first position in overall sample, Employment engineering women, and Unemployment engineering women with RII (71.08), RII (77.24), RII (70.00) and ranked in position number five in female students with RII (65.63). In fact customs and traditions control our action in all life work in field or in other things. This is result mean the importance of customs and traditions in our community. Jayne et al., (1999) agreed with this result women who seek entry into male-dominated cultures either have to act like men in order to be successful, or leave if they are not adaptable to the culture, or they can remain in the industry without behaving like men but maintaining unimportant positions. So, women Employment in this industry are faced up to several difficulties within this culture.

"From my experience, I think that the traditional role of women as wives and mother affect the accepted work in the field" was ranked in the second position for overall sample of computer engineer. This factor discussed in page number (32).

"Women fit administrative work more than work at the sites" was ranked in the second position for overall sample of computer engineer. This factor discussed in page number (32).

"Confined my optional for the engineering profession on obtain high average in high school" was ranked in the last position for overall sample of computer engineer. This factor discussed in page number (32).

#### 4.3.4.5 Discipline: Industry engineering women

**Table (4.26) Rank and RII of fourth Group: Social value and prestige related with engineer "industry engineer"**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Customs and traditions in a community affect my actions in the field of employment.	80.00	1	70.00	4	80.00	1	100.00	1	0.250
Women fit administrative work more than work at the sites.	77.14	2	85.00	2	80.00	1	60.00	3	0.069
From my experience, I think that the traditional role of women as wives and mother affect accepted work in the field.	71.43	3	75.00	3	40.00	3	80.00	2	0.041
My dream to be engineering leads me to choose this profession.	71.43	3	95.00	1	40.00	3	40.00	4	0.003
Some things are related to the nature of work not suitable for work in the field of engineering.	60.00	4	55.00	6	40.00	3	80.00	2	0.456
Social level of engineering leads me to choose this profession.	57.14	5	70.00	4	40.00	3	40.00	4	0.042
Provide job opportunities in the field of engineering impact on the selected engineering discipline.	54.29	6	50.00	7	60.00	2	60.00	3	0.766
Prestige of engineering career leads me to choose this profession.	51.43	7	60.00	5	40.00	3	40.00	4	0.290
Confined my optional for the engineering profession on obtain high average in high school.	51.43	7	60.00	5	40.00	3	40.00	4	0.290
<b>All factors</b>	<b>63.81</b>		<b>68.89</b>		<b>51.11</b>		<b>60.00</b>		<b>0.036</b>

Table (4.26) indicated that "Customs and traditions in a community affect my actions in the field of employment" was ranked in the first position of overall sample for industry engineering women. This factor discussed in page number (32).

"Women fit administrative work more than work at the sites" was ranked in the second position of overall sample for industry engineering women. This factor discussed in page number (32).

"Confined my optional for the engineering profession on obtain high average in high school" was ranked in the last position of overall sample for industry engineering women. This factor discussed in page number (32).

### 4.3.3.6 Comparison for each discipline

Table (4.27) Comparison for each discipline related to the forth group "Social value and prestige related with engineer"

Rank	Civil	RII	Architecture	RII	Communication	RII	Computer	RII	Industry	RII
1	Women fit administrative work more than work at the sites.	77.95	Women fit administrative work more than work at the sites.	78.29	Women fit administrative work more than work at the sites.	72.41	Customs and traditions in a community affect my actions in the field of employment.	71.08	Customs and traditions in a community affect my actions in the field of employment.	80.00
2	From my experience, I think that the traditional role of women as wives and mother affect the accepted work in the field.	74.87	From my experience, I think that the traditional role of women as wives and mother affect the accepted work in the field.	77.14	From my experience, I think that the traditional role of women as wives and mother affect the accepted work in the field.	71.03	From my experience, I think that the traditional role of women as wives and mother affect the accepted work in the field.	69.23	Women fit administrative work more than work at the sites.	77.14
3	Customs and traditions in a community affect my actions in the field of employment.	73.85	Customs and traditions in a community affect my actions in the field of employment.	76.00	My dream to be engineering leads me to choose this profession.	69.66	Women fit administrative work more than work at the sites.	69.23	From my experience, I think that the traditional role of women as wives and mother affect the accepted work in the field.	71.43
4	Some things are related to the nature of women not suitable for work in the field of engineering.	68.21	My dream to be engineering leads me to choose this profession.	74.29	Customs and traditions in a community affect my actions in the field of employment.	66.90	My dream to be engineering leads me to choose this profession.	68.31	My dream to be engineering leads me to choose this profession.	71.43
5	My dream to be engineering leads me to choose this profession.	67.18	Some things are related to the nature of women not suitable for work in the field of engineering.	65.71	Some things are related to the nature of women not suitable for work in the field of engineering.	65.52	Some things are related to the nature of women not suitable for work in the field of engineering.	65.23	Some things are related to the nature of women not suitable for work in the field of engineering.	60.00
6	Provide job opportunities in the field of engineering impact on the selected engineering discipline.	66.15	Social level of engineering leads me to choose this profession.	63.43	Confined my optional for the engineering profession on obtain high average in high school.	62.76	Provide job opportunities in the field of engineering impact on the selected engineering discipline.	60.00	Social level of engineering leads me to choose this profession.	57.14
7	Prestige of engineering career leads me to choose this profession.	65.13	Confined my optional for the engineering profession on obtain high average in high school.	60.57	Social level of engineering leads me to choose this profession.	62.76	Social level of engineering leads me to choose this profession.	58.77	Provide job opportunities in the field of engineering impact on selected engineering discipline.	54.29
8	Social level of engineering leads me to choose this profession.	64.62	Prestige of engineering career leads me to choose this profession.	57.71	Prestige of engineering career leads me to choose this profession.	57.24	Prestige of engineering career leads me to choose this profession.	58.15	Prestige of engineering career leads me to choose this profession.	51.43
9	Confined my optional for the engineering profession on obtain high average in high school.	61.54	Provide job opportunities in the field of engineering impact on the selected engineering discipline.	53.71	Provide job opportunities in the field of engineering impact on the selected engineering discipline.	54.48	Confined my optional for the engineering profession on obtain high average in high school.	56.62	Confined my optional for the engineering profession on obtain high average in high school.	51.43

Table (4.27) indicated that *"Women fit administrative work more than work at the sites"* was ranked in the first position for each civil, Architecture and communication discipline for engineering women, and ranked in the second position for each computer and industry discipline for engineering women. This ranked is much closed this mean that administrative work fit for women than work in site and this agreed with literature.

*"From my experience, I think that the traditional role of women as wives and mother affect the accepted work in the field"* was ranked in the second position for each civil, Architecture, communication and computer discipline for engineering women, and ranked in third position for industry discipline . This ranked is much closed this mean that administrative work fit for women than work in site and this agreed with literature, so there is no difference between the factors related to traditional role of women.

*"Customs and traditions in a community affect my actions in the field of employment"* was ranked in third position for civil and Architecture engineering discipline, also ranked in fourth position for communication engineer, and ranked in the first position for computer and industry discipline. This result indicated to the importance of customs and traditions for computer and industry engineering women when they work and their affect them rather than civil, Architecture and communication engineering women.

*"Some things are related to the nature of women not suitable for work in the field of engineering"* was ranked in position number four for civil, computer, industry engineer, also ranked in position five for architect and communication engineering women. This ranked is much closed this mean that administrative work fit for women than work in site and this agreed with literature, so there is no difference between the factors related to traditional role of women.

*"My dream to be engineering leads me to choice this profession"* was ranked in position number five for civil engineer, also ranked in position number four for architect engineer, and ranked in third position for communication, computer and industry. This result indicate that dream to be engineer is reason for choose engineer for communication, computer and industry rather than Architecture and civil engineer.

*"Provide job opportunities in the field of engineering impact on the selected engineering discipline"* was ranked in position number six for civil and industry engineer, also ranked in position number nine for architect, communication and ranked in position number five for computer engineer. This ranked is far but a job opportunity is important to computer, civil, industry engineer rather than Architecture and communication engineer.

*"Prestige of engineering career leads me to choice this profession"* was ranked in position number seven for civil, computer and industry engineer also ranked in position number eight for architect, communication.

*"Social level of engineering leads me to choice this profession"* was ranked in position number eight for civil engineer also ranked in position number six for architect, computer and ranked in position number five for industry engineer.

*"Confined my optional for the engineering profession on obtain high average in high school"* was ranked in position number nine for civil engineer, also ranked in position

number seven for architect and industry, also ranked in position number six for communication and ranked in position number eight for computer engineer.

From this result can note that the average of high school, Social level, Prestige are ranked in the last position for all discipline of engineer, this reduce the important of this factor on women when choose her career in engineer. For me this is the most important factor that leads me to study engineering discipline.

#### 4.3.5 Fifth Group: Work environment and working hours

##### 4.3.5.1 Discipline: Civil engineering women

Table (4.28) show the relative importance indices and ranks of factors of the group number five " *Work environment and working hours* " this group contains 9 factors.

**Table (4.28) Rank and RII of Group number five: Work environment and working hours "Civil engineer"**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Evening work is not appropriate for women.	76.92	1	82.07	1	80.00	1	71.88	2	0.006
The nature of the work in engineering fields promotes the presence of women.	76.00	2	77.24	2	75.00	2	75.00	1	0.802
Irregular Employment days is not appropriate for women	71.38	3	76.55	3	75.00	2	66.25	4	0.123
Long working hours effect women to the choice profession in engineering.	68.92	4	76.55	3	80.00	1	60.63	6	0.000
Women less receptive to work in an unsafe environment than men.	68.92	4	72.41	4	70.00	3	65.63	5	0.343
Harsh Employment environment is not suitable for Employment women	68.31	5	71.03	5	65.00	4	66.25	4	0.551
Women are less likely to work in high temperature weather.	66.15	6	64.83	6	65.00	4	67.50	3	0.884
Travels between work sites are not suitable for women.	59.69	7	64.14	7	50.00	5	56.88	7	0.241
Limited number of leave days affect the choice of engineering as a profession for women	56.00	8	58.62	8	65.00	4	52.50	8	0.370
<b>All factors</b>	68.03		71.49		69.44		64.72		0.036

Table (4.28) indicated that "*Evening work is not appropriate for women*" was ranked in the first position for overall sample, Employment engineering women, Unemployment engineering women with RII (76.92), RII(82.07), RII(80.00) and ranked in second position in female students with RII (71.88). P-value for this factor .006 is less than .05 so there is difference in the opinion of employment, unemployment, female students. This result agreed with Arslan and Kivrak (2004) when he found women do not want to stay overnight at sites and does not work nightshifts and weekends.

"*The nature of the work in engineering fields promotes the presence of women*" was ranked in second position in overall sample, Employment and Unemployment engineering women with RII (76.00), RII (77.24), RII (75.00), ranked in first position in female students with RII (75.00). This result agreed with Warren (2003) result that women choose a career



in the construction industry if the work environment provides good Employment conditions, but disagreed with Chileshe and Haupt (2010), (Kumbhar, 2011) results that Safety and health problems in construction create barriers to women entering and remaining in this field.

"Long Employment hour's effect women to the choice profession in engineering" P-vale of this factor 0.000 is less than .05 so there is different between the opinions of Employment, unemployment, female student's sample. This difference in opinion is return to the work experience of category.

"Limited number of leave days affects the choice of engineering as a profession for women" was ranked in the last position in overall sample, Employment and female students with RII (56.00), RII (58.62), RII (52.50), and ranked in position number four for Unemployment engineering women with RII (65.00).

#### 4.3.5.2 Discipline: Architecture engineering women

Table (4.29) Rank and RII of Group number five: Work environment and working hours "Architecture engineer"

Number	Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		F-test	P-Value
		RII	Rank	RII	Rank	RII	Rank	RII	Rank		
٤	Evening work is not appropriate for women	81.71	1	81.60	1	92.00	1	72.00	2	2.812	0.075
٩	The nature of the work in engineering fields promotes the presence of women.	75.43	2	74.40	4	80.00	4	76.00	1	0.167	0.847
٦	Women less receptive to work in an unsafe environment than men.	74.86	3	75.20	3	88.00	2	60.00	4	2.839	0.073
٢	Long working hours effect women to the choice profession in engineering.	73.71	4	74.40	4	84.00	3	60.00	4	1.985	0.154
٥	Irregular Employment days is not appropriate for women	73.14	5	78.40	2	68.00	6	52.00	6	4.332	0.022
١	Women are less likely to work in high temperatures weather.	69.14	6	69.60	5	64.00	7	72.00	3	0.208	0.813
٣	Harsh Employment environment is not suitable for Employment women	68.57	7	69.60	5	72.00	5	60.00	4	0.576	0.568
٨	Limited number of leave days affect the choice of engineering as a profession for women	65.71	8	66.40	6	72.00	5	56.00	5	0.867	0.430
٧	Travels between work sites are not suitable for women.	58.29	9	64.00	7	44.00	8	44.00	4	3.210	0.054
	<b>All factors</b>	71.17		72.62		73.78		61.33		2.028	0.148

Table (4.29) indicated that "Evening work is not appropriate for women" was ranked in first position in overall sample, Employment, Unemployment engineering women and in female students ranked in second position. This factor discussed in page (39).

"The nature of the work in engineering fields promotes the presence of women" was ranked in second position in overall sample, ranked in position four in Employment engineering women and Unemployment engineering women, and ranked in first position in female students. This factor discussed in page (39).

"Travels between work sites are not suitable for women" was ranked in position number nine in overall sample, ranked in position number seven in employment engineering women, ranked in position number eight in Unemployment engineering women, and ranked in position number four in female students. This factor discussed in page (39).

"Irregular Employment days are not appropriate for women" P-value of this factor is .002 is less than .05 so there is difference between the opinion of three category were ranked in position five in overall sample, ranked in second position for Employment engineering women and ranked in position number six in Unemployment engineering women and female students. This different return in my opinion for Employment women experience in the work environment so that ranked in second position, but female students and Unemployment engineering women don't experience the work environment and they don't feel with responsibility of work and home.

#### 4.3.5.3 Discipline: Communication engineering women

**Table (4.30) Rank and RII of Group number five: Work environment and working hours "Communication engineer"**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Evening work is not appropriate for women	76.55	1	77.27	1	75.00	1	73.33	2	0.919
Women less receptive to work in an unsafe environment than men.	75.86	2	76.36	2	70.00	2	80.00	1	0.755
Irregular Employment days is not appropriate for women	75.17	3	75.45	3	75.00	1	73.33	2	0.982
Women are less likely to work in high temperatures weather.	73.79	4	74.55	3	70.00	2	73.33	2	0.901
Long working hours effect women to the choice profession in engineering.	73.79	5	75.45	3	70.00	2	66.67	3	0.712
The nature of the work in engineering fields promotes the presence of women.	71.72	6	71.82	4	75.00	1	66.67	3	0.770
Harsh Employment environment is not suitable for Employment women	68.28	7	69.09	5	70.00	2	60.00	4	0.669
Limited number of leave days affect the choice of engineering as a profession for women	67.59	8	68.18	6	70.00	2	60.00	4	0.793
Travels between work sites are not suitable women.	64.83	9	66.36	7	60.00	3	60.00	4	0.738
<b>All factors</b>	<b>71.95</b>		<b>72.73</b>		<b>70.56</b>		<b>68.15</b>		<b>0.792</b>

Table (4.30) indicated that "Evening work is not appropriate for women" was ranked in first position in overall sample, Employment engineering women, Unemployment engineering women, and ranked in second position in female students. This factor discussed in page (39).

"Women less receptive to work in an unsafe environment than men" was ranked in second position in overall sample, Employment engineering women, Unemployment engineering women with RII (75.86), RII (76.36), RII (70.00), and ranked in first position in female students with RII (80.00). This result is agreed with Chileshe and

Haupt (2010) and Warren (2003) that result is safety and health problems in construction create barriers to women entering and remaining in this field.

"Travels between work sites are not suitable for women" was ranked in last position in overall sample, ranked in position seven in Employment engineering women, also in third position for Unemployment engineering women and ranked in position number four in female students. This factor discussed in page (39).

#### 4.3.5.4 Discipline: Computer engineering women

**Table (4.31) Rank and RII of Group number five: Work environment and working hours "Computer engineer"**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Evening work is not appropriate for women	76.92	1	82.07	1	80.00	1	71.88	2	0.006
The nature of the work in engineering fields promotes the presence of women.	76.00	2	77.24	2	75.00	2	75.00	1	0.802
Irregular Employment days is not appropriate for women	71.38	3	76.55	3	75.00	2	66.25	4	0.123
Long working hours effect women to the choice profession in engineering.	68.92	4	76.55	3	80.00	1	60.63	6	0.000
Women less receptive to work in an unsafe environment than men.	68.92	4	72.41	4	70.00	3	65.63	5	0.343
Harsh Employment environment is not suitable for Employment women	68.31	5	71.03	5	65.00	4	66.25	4	0.551
Women are less likely to work in high temperature weather.	66.15	6	64.83	6	65.00	4	67.50	3	0.884
Travels between work sites are not suitable for women.	59.69	7	64.14	7	50.00	5	56.88	7	0.241
Limited number of leave days affect the choice of engineering as a profession for women	56.00	8	58.62	8	65.00	4	52.50	8	0.370
<b>All factors</b>	<b>68.03</b>		<b>71.49</b>		<b>69.44</b>		<b>64.72</b>		<b>0.036</b>

Table (4.31) indicated that "Evening work is not appropriate for women" was ranked in the first position in overall sample, Employment , Unemployment engineering women and ranking in second position in female students. This factor discussed in page (39).

"The nature of the work in engineering fields promotes the presence of women" was ranked in second position in overall sample, Employment and Unemployment engineering women and ranking in first position in female student's sample. This factor discussed in page (39).

"Limited number of leave days affects the choice of engineering as a profession for women" was ranked in last position in overall sample, Employment and in female students and ranked in position four in Unemployment engineering women. This factor discussed in page (39).

"Long Employment hour's effect women to the choice profession in engineering" P-value of this factor is 0.000 less than 0.05 so there is difference in opinion between three category were ranked in position four in overall sample, ranked in third position in employment

women, ranked in first position in Unemployment engineering women and ranked in position number six in female students. This different return in my opinion in employment women experience in the work environment so that ranked in second position, but female students and Unemployment engineering women don't experience the work environment and they don't feel with responsibility of work and home.

#### 4.3.5.5 Discipline: Industry engineering women

**Table (4.32) Rank and RII of Group number five: Work environment and working hours "Industry engineer"**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
The nature of the work in engineering fields promotes the presence of women.	80.00	1	75.00	1	100.00	1	80.00	1	0.141
Long working hours effect women to the choice profession in engineering.	71.43	2	65.00	3	80.00	2	80.00	1	0.548
Evening work is not appropriate for women	71.43	2	70.00	2	100.00	1	60.00	2	0.276
Irregular Employment days is not appropriate for women	68.57	3	70.00	2	40.00	4	80.00	1	0.276
Harsh Employment environment is not suitable for Employment women	65.71	4	65.00	3	80.00	2	60.00	2	0.826
Women less receptive to work in an unsafe environment than men.	62.86	5	65.00	3	60.00	3	60.00	2	0.956
Women are less likely to work in high temperatures weather.	60.00	6	65.00	3	40.00	4	60.00	2	0.473
Limited number of leave days affect the choice of engineering as a profession for women	57.14	7	60.00	4	40.00	4	60.00	2	0.678
Travels between work sites are not suitable for women.	51.43	8	50.00	5	40.00	4	60.00	2	0.766
<b>All factors</b>	<b>65.40</b>		<b>65.00</b>		<b>64.44</b>		<b>66.67</b>		<b>0.944</b>

Table (4.32) indicated that *"The nature of the work in engineering fields promotes the presence of women"* was ranked in the first position in all categories overall sample, Employment, Unemployment engineering women and female students. This factor discussed in page (39).

*"Long Employment hour's effect women to the choice profession in engineering"* was ranked in second position in overall sample and Unemployment engineering women, and raked third position in Employment engineering women, and ranked in first position in female students sample. This factor discussed in page (39).

*"Travels between work sites are not suitable for women"* was ranked in last position in overall sample, ranked in position number five in employment engineering women, ranked in position number four in Unemployment engineering women, and ranked in second position in female students' sample. This factor discussed in page (39).

### 4.3.5.6 Comparison for each discipline

Table (4.33) comparison for each discipline related to the group number five "Work environment and working hours"

Ranked	Civil	RII	Architecture	RII	Communication	RII	Computer	RII	Industry	RII
1	Evening work is not appropriate for women.	76.92	Evening work is not appropriate for women	81.71	Evening work is not appropriate for women	76.55	Evening work is not appropriate for women	76.92	The nature of the work in engineering fields promotes the presence of women.	80.00
2	The nature of the work in engineering fields promotes the presence of women.	76.00	The nature of the work in engineering fields promotes the presence of women.	75.43	Women less receptive to work in unsafe environment than men.	75.86	The nature of the work in engineering fields promotes the presence of women.	76.00	Long working hours effect women to the choice profession in engineering.	71.43
3	Irregular Employment days is not appropriate for women	71.38	Women less receptive to work in an unsafe environment than men.	74.86	Irregular Employment days is not appropriate for women	75.17	Irregular Employment days is not appropriate for women	71.38	Evening work is not appropriate for women	71.43
4	Long working hours effect women to the choice profession in engineering	68.92	Long working hours effect women to the choice profession in engineering.	73.71	Women are less likely to work in high temperatures weather.	73.79	Long working hours effect women to the choice profession in engineering.	68.92	Irregular Employment days is not appropriate for women	68.57
5	Women less receptive to work in an unsafe environment than men.	68.92	Irregular Employment days is not appropriate for women	73.14	Long working hours effect women to the choice profession in engineering.	73.79	Women less receptive to work in an unsafe environment than men.	68.92	Harsh Employment environment is not suitable for Employment women	65.71
6	Harsh Employment environment is not suitable for Employment women	68.31	Women are less likely to work in high temperatures weather.	69.14	The nature of the work in engineering fields promotes the presence of women.	71.72	Harsh Employment environment is not suitable for Employment women	68.31	Women less receptive to work in an unsafe environment than men.	62.86
7	Women are less likely to work in high temperatures weather.	66.15	Harsh Employment environment is not suitable for Employment women	68.57	Harsh Employment environment is not suitable for Employment women	68.28	Women are less likely to work in high temperatures weather.	66.15	Women are less likely to work in high temperatures weather.	60.00
8	Travels between work sites are not suitable for women.	59.69	Limited number of leave days affect the choice of engineering as a profession for women	65.71	Limited number of leave days affect the choice of engineering as a profession for women	67.59	Travels between work sites are not suitable for women.	59.69	Limited number of leave days affect the choice of engineering as a profession for women	57.14
9	Limited number of leave days affect the choice of engineering as a profession for women	56.00	Travels between work sites are not suitable for women.	58.29	Travels between work sites are not suitable for women.	64.83	Limited number of leave days affect the choice of engineering as a profession for women	56.00	Travels between work sites are not suitable for women.	51.43

Table (4.33) indicated that *"Evening work is not appropriate for women"* was ranked in first position for Civil, Architecture, Communication and computer engineer and ranked in position number two for industry engineering women, ranking is very closed so there is no difference between the opinion of all discipline. This result agreed with Arslan and Kivrak (2004) when he found women do not want to stay overnight at sites and does not work nightshifts and weekends.

*"The nature of the work in engineering fields promotes the presence of women"* was ranked in second position for civil, Architecture and computer engineer, also ranked in the first position for industry engineering women and ranked in position number six for communication engineering women. Ranking are much closed for civil, Architecture, computer and industry engineer so I think there is no difference in opinion of this discipline, but for communication engineer there is difference and I agreed with them and add my voice to them there is difficulty to work since there is few men care she is women they must treat with them in different way.

*"Irregular Employment days is not appropriate for women"* was ranked in position number three for civil, communication, computer and industry engineering women and ranked in position five for architect. Architecture engineering women can work any time anywhere so Employment day is not affecting their choice of engineering discipline.

*"Long working hours effect women to the choice profession in engineering"* was ranked in position number four for civil, Architecture, also ranked in position number five for communication engineering women, also ranked in position number four for computer and ranked in second position for industry engineering women. Ranking between civil, Architecture, communication and computer but industry engineering women that factor effect their choice rather than other engineering discipline that may be return to the nature of industry Employment.

*"Women less receptive to work in an unsafe environment than men"* ranked in position number four for civil and computer engineer and position number tow for communication engineer also ranked in position number five for industry engineering women and ranked in second position ranking is closed between different discipline the different return to nature of work in each discipline.

*"Limited number of leave days affects the choice of engineering as a profession for women"* was ranked in position number eight for civil, Architecture and communication engineering women also ranked in position six for computer engineer and ranked in position number seven for industry engineering women. Ranking is very closed this mean that the low effect role women when choosing their career.

#### **4.3.5.7 Third hypotheses tested in this research are**

- Null hypothesis(H<sub>0</sub>): The work environment of some engineering disciplines militates against women's ability to work (at .05 levels).
- Alternative hypothesis (H<sub>1</sub>): The work environment of some engineering disciplines that help women's to work (at .05 levels).

Table 4.34 indicated that P-value (0.001) < 0.05 for overall sample as whole, but there are several factors inside this group have P-value > 0.05. Thus, null hypothesis cannot reject, alternative hypothesis is rejected for the phase as whole, and alternative hypothesis is substantiated for some factors.

**Table (4.34) Work environment and working hours of overall sample of all discipline of engineering women Employment in the field of engineering**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Evening work is not appropriate for women	78.74	1	80.91	1	82.11	1	72.17	2	0.002
The nature of the work in engineering fields promotes the presence of women.	74.97	2	74.73	4	75.79	3	75.22	1	0.957
Irregular Employment days is not appropriate for women	73.71	3	77.45	2	68.42	5	66.96	5	0.003
Long working hours effect women to the choice of profession in engineering.	72.57	4	76.18	3	77.89	2	61.74	7	0.000
Women less receptive to work in an unsafe environment than men.	72.46	5	74.36	5	74.74	4	66.96	4	0.060
Harsh Employment environment is not suitable for Employment women	68.91	6	70.55	6	67.37	6	65.65	6	0.281
Women are less likely to work in high temperature weather.	68.80	7	70.18	7	62.11	8	68.26	3	0.276
Limited number of leave days affect the choice of engineering as a profession for women	62.63	8	66.18	8	63.16	7	53.91	9	0.004
Travels between work sites are not suitable for women.	60.69	9	64.00	9	50.53	9	56.96	8	0.011
<b>All factors</b>	<b>70.39</b>		<b>72.73</b>		<b>69.12</b>		<b>65.31</b>		<b>0.001</b>

As mentioned above that the alternative hypothesis is substantiated for some factors, this partially substantiated from the significant difference (at level 0.05) between the opinions of Employment, Unemployment and female students engineering women in different discipline. These factors are:

1. P-value (0.957) > 0.05 for factor "*The nature of the work in engineering fields promotes the presence of women*". So there is significant difference between the opinions of Employment, Unemployment and female students engineering women in different discipline.
2. P-value (0.281) > 0.05 for factor "*Harsh Employment environment is not suitable for Employment women*". So there is significant difference between the opinions of Employment, Unemployment and female students engineering women in different discipline.
3. P-value (0.276) > 0.05 for factor "*Women are less likely to work in high temperatures weather*". So there is significant difference between the opinions of Employment, Unemployment and female students engineering women in different discipline.

### 4.3.6 Group number six: Family and parents

#### 4.3.6.1 Discipline: Civil engineering women

Table (4.40) show the relative importance indices and ranks of factors of the group number six " Family and parents " this group contains 9 factors.

**Table (4.35) Rank and RII of Group number six: Family and parents "Civil engineer"**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
accounting, legal or doctor more attractive and popular for women of being an engineer	65.64	1	68.67	1	76.00	2	30.00	5	0.004
my parents have a significant effect the choice of specialization in engineering	65.13	2	66.00	2	76.00	2	45.00	3	0.169
The profession of my parents have a significant impact on the choice of specialization in engineering	62.05	3	64.00	3	56.00	6	55.00	1	0.528
Level of education of my parents has a significant effect the choice of specialization in engineering	60.51	4	62.67	4	64.00	4	40.00	4	0.340
One of my family member has a significant effect the choice of specialization in engineering	60.00	5	60.00	5	68.00	3	50.00	2	0.530
my Friends have significant effect the choice of specialization in engineering	57.44	6	54.00	8	80.00	1	55.00	1	0.067
Women familiar with the opportunities available for the job in engineering disciplines.	57.44	6	57.33	6	60.00	5	55.00	1	0.950
Man has experienced more than women in engineering fields.	53.85	7	55.33	7	56.00	6	40.00	4	0.544
Financially level of my family leads me to study engineering.	48.21	8	48.00	9	56.00	6	40.00	4	0.380
<b>All factors</b>	<b>58.92</b>		<b>59.56</b>		<b>65.78</b>		<b>45.56</b>		<b>0.075</b>

Table (4.35) indicated that "accounting, legal or doctor more attractive and popular for women of being an engineer" it was ranked in first position in overall sample, Employment engineering women with RII (65.64), RII (68.67), ranked in second position in Unemployment engineering women with RII (76.00). And it was ranked in position number five in female students with RII (30.00). P-value of this factor is (0.004) are less than 0.05 so there is difference between the opinion of Employment, Unemployment engineering women, and female students. This result agreed with Chovwen (2003) but disagreed with Ososki et al. (2006) study revealed that female students viewed teaching as a career that offers limited job opportunities, poor career progression and limited promotion opportunities. It was reported that teachers are not rewarded for good performance.

"My parents have a significant effect the choice of specialization in engineering" was ranked in second position in overall sample, Employment engineering women, Unemployment engineering women with RII (65.13), RII (66.00), and RII (76.00) and ranked in third position in female students with RII (45.00). This result agreed with Borchert(2002), kassim et.al(2011), badolato(1998), Georgiou(1999), furlong (1986), and fielden et. al (2000).



"Financially level of my family leads me to study engineering" was ranked in last position for all categories of civil engineering women with RII (48.21), RII (48.00), RII (56.00), RII (40.00). This factor have low effect women when choice her career.

#### 4.3.6.2 Discipline: Architecture engineering women

Table (4.36) Rank and RII of Group number six: Family and parents "Architecture engineer"

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
One of my family member has a significant effect the choice of specialization in engineering	67.43	1	64.00	3	88.00	1	64.00	2	0.090
Level of education of my parents has a significant effect the choice of specialization in engineering	65.71	2	67.20	1	56.00	6	68.00	1	0.645
my parents have a significant effect the choice of specialization in engineering	65.71	2	65.60	2	72.00	4	60.00	3	0.688
The profession of my parents have a significant impact on the choice of specialization in engineering	62.86	3	60.00	4	76.00	3	64.00	2	0.332
Man has experienced more than women in engineering fields.	60.00	4	55.20	6	80.00	2	64.00	2	0.153
Women familiar with the opportunities available for the job in engineering disciplines.	57.71	5	56.00	5	60.00	5	64.00	2	0.749
accounting, legal or doctor more attractive and popular for women of being an engineer	57.14	6	54.40	7	60.00	5	68.00	1	0.515
my Friends have significant effect the choice of specialization in engineering	56.00	7	60.00	4	40.00	7	52.00	4	0.182
Financially level of my family leads me to study engineering.	42.29	8	40.80	8	40.00	7	52.00	4	0.380
<b>All factors</b>	<b>59.43</b>		<b>58.13</b>		<b>63.56</b>		<b>61.78</b>		<b>0.653</b>

From table (4.36) "One of my family members has a significant effect the choice of specialization in engineering" was ranked in the first position in overall sample and Unemployment engineering women with RII (67.43); RII (88.00), ranked in second position in female students with RII (64.00) and ranked in third position in Employment engineering women RII (64.00). This factor have high effect women when choice her career.

"Level of education of my parents has a significant effect the choice of specialization in engineering" was ranked in second position in overall sample with RII (65.71), ranked in first position in Employment engineering women and female students with RII (67.20), RII (68.00) and ranked position number six in Unemployment engineering women with RII (56.00). This result agreed with Burline(1976), Borchert(2002), otto (2000), Mau &Bikos(2000), Domenico and Jones (2006), Furlong (1986) result that the occupational status and educational level of females' parents have had a significant impact on their career choice.

"Financially level of my family leads me to study engineering" was ranked in last position for all categories of civil engineering women with RII (42.29), RII (40.80), RII (40.00), RII (52.00).

#### 4.3.6.3 Discipline: Communication engineering women

Table (4.37) Rank and RII of Group number six: Family and parents "Communication engineer"

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Level of education of my parents has a significant effect the choice of specialization in engineering	69.66	1	70.00	1	60.00	2	80.00	1	0.554
accounting, legal or doctor more attractive and popular for women of being an engineer	63.45	2	62.73	2	70.00	1	60.00	3	0.800
my parents have a significant effect the choice of specialization in engineering	60.00	3	60.00	3	50.00	3	73.33	2	0.458
The profession of my parents have a significant impact on the choice of specialization in engineering	59.31	4	62.73	2	45.00	4	53.33	4	0.338
One of my family member has a significant effect the choice of specialization in engineering	57.93	5	57.27	4	45.00	4	80.00	1	0.145
Man has experienced more than women in engineering fields.	57.24	6	60.00	3	40.00	5	60.00	3	0.304
Women familiar with the opportunities available for the job in engineering disciplines.	51.72	7	52.73	5	30.00	6	73.33	2	0.037
my Friends have significant effect the choice of specialization in engineering	50.34	8	48.18	6	45.00	4	73.33	2	0.114
Financially level of my family leads me to study engineering.	48.97	9	48.18	6	45.00	4	60.00	3	0.498
<b>All factors</b>	57.62		57.98		47.78		68.15		0.209

Table (4.37) indicated that "Level of education of my parents has a significant effect the choice of specialization in engineering" was ranked in first position in overall sample, Employment engineering women and in female students with RII (69.66), RII (70.00), RII (80.00) and ranked in second position in Unemployment engineering women with RII (60.00). This factor discuss in page (47).

"Accounting, legal or doctor more attractive and popular for women of being an engineer" was ranked in second position for overall sample and employment engineering women with RII (63.45), RII (62.73), ranked in first position in Unemployment engineering women with RII (70.00) and ranked in third position in female students with RII (60.00). This factor discuss in page (47).

"Financially level of my family leads me to study engineering" was ranked in position number nine in overall sample with RII (48.97), ranked in position number six with RII (48.18) in Employment engineering women, ranked in position number four with RII (45.00) in Unemployment engineering women and ranked in position number three in female students with RII (60.00). This factor discuss in page (47).

#### 4.3.6.4 Discipline: Computer engineering women

Table (4.38) indicated that "Women familiar with the opportunities available for the job in engineering disciplines" was ranked in first position in overall sample and in female students with RII (64.31), RII (61.88), ranked in second position in Unemployment engineering women with RII (65.00) and ranked in position number four in Employment engineering women with RII (66.90). This result is agreed with

Azizzadeh et al. (2003), Jones and Larke (2005) and Ososki et al. (2006) results that career opportunities, meaning demand for such careers attracted female students to the field. Also agreed with Madikizela(2008) result that women familiar with the opportunities available for the job in engineering disciplines. And disagreed with Fielden et al. (2000) result that there are lack of knowledge and information about the career opportunities available. In 2012, In the Gaza Strip Bulletin Engineers Association disclaimer to high school female students to think carefully before studying engineering for lack of employment opportunities, and increase the number of engineers don't work in the Gaza Strip and in the same disclaimer has published the number of engineers who are Employment and the number of engineers don't work, in a reference to the importance of finding jobs after studying. This indicated the importance of this factor "job opportunities and societal need" on choosing the career.

"My parents have a significant effect the choice of specialization in engineering" was ranked in second position in overall sample and Unemployment engineering women with RII (62.77), RII (65.00) , ranked in first position Employment engineering women with RII (71.72) and ranked in position number five in female students with RII (54.38). P-value of this factor is 0.003 less than .05 so there is difference in opinion between all categories this may be return to their experience in work environment and responsibility.

"Financially level of my family leads me to study engineering" was ranked in last position for all categories of computer engineer, this factor discussed in page (47).

"Man has experienced more than women in engineering fields" P-value of this factor is .027 is less than .05 so there is difference in opinion between all categories this may be return to their experience in work environment and responsibility.

**Table (4.38) Rank and RII of Group number six: Family and parents "Computer engineer"**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Women familiar with the opportunities available for the job in engineering disciplines.	64.31	1	66.90	4	65.00	2	61.88	1	0.662
my parents have a significant effect the choice of specialization in engineering	62.77	2	71.72	1	65.00	2	54.38	5	0.003
One of my family member has a significant effect the choice of specialization in engineering	62.15	3	67.59	3	45.00	4	59.38	2	0.067
Level of education of my parents has a significant effect the choice of specialization in engineering	61.54	4	68.28	2	50.00	3	56.88	3	0.099
Man has experienced more than women in engineering fields.	60.62	5	64.83	6	80.00	1	54.38	5	0.027
The profession of my parents have a significant impact on the choice of specialization in engineering	60.31	6	66.21	5	50.00	3	56.25	4	0.180
accounting, legal or doctor more attractive and popular for women of being an engineer	54.77	7	57.93	7	55.00	3	51.88	6	0.574
my Friends have significant effect the choice of specialization in engineering	54.46	8	57.93	7	50.00	3	51.88	6	0.546
Financially level of my family leads me to study engineering.	53.23	9	55.17	8	55.00	3	51.25	7	0.648
<b>All factors</b>	59.35		64.06		57.22		55.35		0.029

#### 4.3.6.5 Discipline: Industry engineering women

Table (4.39) Rank and RII of Group number six: Family and parents "Industry engineer"

Statement	Over all sample		Employment engineering women		Unemployment Engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Women familiar with the opportunities available for the job in engineering disciplines.	54.29	1	65.00	1	40.00	2	40.00	1	0.257
my parents have a significant effect the choice of specialization in engineering	51.43	2	60.00	2	80.00	1	20.00	2	0.042
One of my family member has a significant effect the choice of specialization in engineering	48.57	3	55.00	3	80.00	1	20.00	2	0.080
my Friends have significant effect the choice of specialization in engineering	48.57	3	55.00	3	80.00	1	20.00	2	0.080
Level of education of my parents has a significant effect the choice of specialization in engineering	45.71	4	50.00	4	80.00	1	20.00	2	0.101
The profession of my parents have a significant impact on the choice of specialization in engineering	42.86	5	55.00	3	40.00	2	20.00	2	0.161
Man has experienced more than women in engineering fields.	42.86	5	35.00	6	80.00	1	40.00	1	0.024
Financially level of my family leads me to study engineering.	40.00	6	40.00	5	40.00	2	40.00	1	1.000
accounting, legal or doctor more attractive and popular for women of being an engineer	40.00	6	40.00	5	40.00	2	40.00	1	.
<b>All factors</b>	46.03		50.56		62.22		28.89		0.005

From table (4.39) "Women familiar with the opportunities available for the job in engineering disciplines" was ranked in first position in overall sample, Employment engineering women and in female students with RII (54.29), RII (65.00), RII (40.00) and ranked in second position in Unemployment engineering women with RII (40.00). This factor discussed in page (47).

"My parents have a significant effect the choice of specialization in engineering" was ranked in second position in overall sample, Employment engineering women and in female students with RII (51.43), RII (60.00), and RII (20.00) and ranked in first position in Unemployment engineering women with RII (80.00). This factor discussed in page (47).

"Financially level of my family leads me to study engineering" was ranked in position number six in overall sample with RII (40.00), ranked in position number five in Employment engineering women with RII (40.00), ranked in second position in Unemployment engineering women with RII (40.00) and ranked in first position in female students with RII (40.00). This factor discussed in page (47).

"Accounting, legal or doctor more attractive and popular for women of being an engineer" was ranked in position number six in overall sample with RII (40.00), ranked in position number five in Employment engineering women with RII (40.00), ranked in second position in Unemployment with RII (40.00) and ranked in first position in female students with RII (40.00). This factor discussed in page (47).

### 4.3.6.6 Comparison for each discipline

**Table (4.40) comparison for each discipline related to the group number six "Family and parents"**

Ranked	Civil	RII	Architecture	RII	Communication	RII	Computer	RII	Industry	RII
1	accounting, legal or doctor more attractive and popular for women of being an engineer	65.64	One of my family member has a significant effect the choice of specialization in engineering	67.43	Level of education of my parents has a significant effect the choice of specialization in engineering	69.66	Women familiar with the opportunities available for the job in engineering disciplines.	64.31	Women familiar with the opportunities available for the job in engineering disciplines.	54.29
2	my parents have a significant effect the choice of specialization in engineering	65.13	Level of education of my parents has a significant effect the choice of specialization in engineering	65.71	accounting, legal or doctor more attractive and popular for women of being an engineer	63.45	my parents have a significant effect the choice of specialization in engineering	62.77	my parents have a significant effect the choice of specialization in engineering	51.43
3	The profession of my parents have a significant impact on the choice of specialization in engineering	62.05	my parents have a significant effect the choice of specialization in engineering	65.71	my parents have a significant effect the choice of specialization in engineering	60.00	One of my family member has a significant effect the choice of specialization in engineering	62.15	One of my family member has a significant effect the choice of specialization in engineering	48.57
4	Level of education of my parents has a significant effect the choice of specialization in engineering	60.51	The profession of my parents have a significant impact on the choice of specialization in engineering	62.86	The profession of my parents have a significant impact on the choice of specialization in engineering	59.31	Level of education of my parents has a significant effect the choice of specialization in engineering	61.54	my Friends have significant effect the choice of specialization in engineering	48.57
5	One of my family member has a significant effect the choice of specialization in engineering	60.00	Man has experienced more than women in engineering fields.	60.00	One of my family member has a significant effect the choice of specialization in engineering	57.93	Man has experienced more than women in engineering fields.	60.62	Level of education of my parents has a significant effect the choice of specialization in engineering	45.71
6	my Friends have significant effect the choice of specialization in engineering	57.44	Women familiar with the opportunities available for the job in engineering disciplines.	57.71	Man has experienced more than women in engineering fields.	57.24	The profession of my parents have a significant impact on the choice of specialization in engineering	60.31	The profession of my parents have a significant impact on the choice of specialization in engineering	42.86
7	Women familiar with the opportunities available for the job in engineering disciplines.	57.44	accounting, legal or doctor more attractive and popular for women of being an engineer	57.14	Women familiar with the opportunities available for the job in engineering disciplines.	51.72	accounting, legal or doctor more attractive and popular for women of being an engineer	54.77	Man has experienced more than women in engineering fields.	42.86
8	Man has experienced more than women in engineering fields.	53.85	my Friends have significant effect the choice of specialization in engineering	56.00	my Friends have significant effect the choice of specialization in engineering	50.34	my Friends have significant effect the choice of specialization in engineering	54.46	Financially level of my family leads me to study engineering.	40.00
9	Financially level of my family leads me to study engineering.	48.21	Financially level of my family leads me to study engineering.	42.29	Financially level of my family leads me to study engineering.	48.97	Financially level of my family leads me to study engineering.	53.23	accounting, legal or doctor more attractive and popular for women of being an engineer	40.00

From table (4.40) *"Accounting, legal or doctor more attractive and popular for women of being an engineer"* was ranked in first position for civil engineer, and ranked in second position for communication engineering women, also ranked in position number six for architect and industry engineering women, and ranked in position number seven for computer engineer. This factor has high effect civil and communication engineering women and low effect Architecture, industry, computer engineering women. This may be return to nature of environment and culture of our society to women work in civil and communication sector. But Architecture and computer discipline depend on task work anytime and anywhere women can work in their home.

*"My parents have a significant effect the choice of specialization in engineering"* was ranked in second position for civil, Architecture, computer, industry engineering women and ranked in third position for communication engineering women. Ranking is much closed so this agreed with the prewise result discuss above.

*"The profession of my parents has a significant impact on the choice of specialization in engineering"* was ranked in third position of civil, Architecture engineering women, also ranked in forth position for communication engineering women, also ranked in position number five for industry engineering women and ranked position number six for computer engineer. This result shows that parent's professions have significant effect women career choice.

*"Level of education of my parents has a significant effect the choice of specialization in engineering"* was ranked in position number four for civil, computer, industry engineering women, also ranked in second position for architect engineering women and ranked in first position for communication engineering women. This result shows that level of education of parents has a significant effect communication and Architecture engineering women rather than civil, computer, industry engineering women.

*"One of my family members has a significant effect the choice of specialization in engineering"* was ranked in position number five for civil and communication engineering women also ranked in first position for architect engineering women and ranked third position for computer and industry engineering women. This result shows that one of family members has a significant effect Architecture engineering women choice rather than any other discipline, and has low effect civil engineering women choice.

*"My Friends have significant effect the choice of specialization in engineering"* was ranked in position number six for civil engineer, also ranked in position number seven for architect engineer, also ranked in position number eight for communication and computer engineering women, and ranked in third position for industry engineering women. This result shows that industry engineering women are effect by their friend choice.

*"Women familiar with the c available for the job in engineering disciplines"* was ranked position number six for civil engineering women also ranked in first position for computer and industry engineering women, also ranked in position number five for architect engineering women and ranked in position number seven for communication engineering women. This result show that computer and industry engineering women have good knowledge with the opportunities available for the job rather than other discipline, and

civil, Architecture, communication engineering women have knowledge in the same range and ranking much closed.

"Man has experienced more than women in engineering fields" was ranked in position number seven for civil engineer, also ranked in position number four for architect engineer, also ranked in position number six for communication and ranked in position number five for computer and industry engineering women.

"Financially level of my family leads me to study engineering" was ranked in last position for all discipline civil, Architecture, communication, computer and industry. This result shows that family financial level of women has low effect women when choose her career.

#### 4.3.6.7 Hypotheses number four tested in this research are

- Null hypothesis (H<sub>0</sub>): Family and parents have significant effect women choice her career in engineering (at .05 levels).
- Alternative hypothesis (H<sub>1</sub>): Family and parents don't have significant effect women choice her career in engineering (at .05 levels).

Table (4.41) indicated that P-value (0.006) < 0.05 for overall sample as whole, but there are several factors inside this group have P-value > 0.05. Thus, null hypothesis cannot be rejected, alternative hypothesis is rejected for the phase as whole, and alternative hypothesis is substantiated for some factors.

**Table (4.41) Family and parents of overall sample of all discipline of engineering women Employment in the field of engineering**

Statement	Over all sample		Employment engineering women		Unemployment Engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
my parents have a significant effect the choice of specialization in engineering	62.97	1	66.00	2	67.37	1	53.91	5	0.006
Level of education of my parents has a significant effect the choice of specialization in engineering	62.86	2	66.18	1	58.95	4	56.52	3	0.073
One of my family member has a significant effect the choice of specialization in engineering	61.49	3	62.18	4	64.21	3	58.70	2	0.582
The profession of my parents have a significant impact on the choice of specialization in engineering	60.34	4	63.09	3	56.84	5	55.22	4	0.102
Women familiar with the opportunities available for the job in engineering disciplines.	58.97	5	58.91	6	53.68	7	61.30	1	0.458
accounting, legal or doctor more attractive and popular for women of being an engineer	58.51	6	60.36	5	64.21	3	51.74	7	0.054
Man has experienced more than women in engineering fields.	57.71	7	58.00	7	65.26	2	53.91	5	0.217
my Friends have significant effect the choice of specialization in engineering	54.51	8	55.27	8	55.79	6	52.17	6	0.713
Financially level of my family leads me to study engineering.	48.69	9	48.00	9	48.42	8	50.43	8	0.727
<b>All factors</b>	<b>70.39</b>		<b>72.73</b>		<b>69.12</b>		<b>65.31</b>		<b>0.006</b>

As mentioned above that the alternative hypothesis is substantiated for some factors, this partially substantiated from the significant difference (at level 0.05) between the opinions of Employment, Unemployment and female students engineering women in different discipline. These factors are:

1. P-value (0.073) > 0.05 for factor "*Level of education of my parents has a significant effect the choice of specialization in engineering*". So there is significant difference between the opinions of Employment, Unemployment and female students engineering women in different discipline.
2. P-value (0.582) > 0.05 for factor "*One of my family members has a significant effect the choice of specialization in engineering*". So there is significant difference between the opinions of Employment, Unemployment and female students engineering women in different discipline.
3. P-value (0.102) > 0.05 for factor "*The profession of my parents has a significant impact on the choice of specialization in engineering*". So there is significant difference between the opinions of Employment, Unemployment and female students engineering women in different discipline.
4. P-value (0.458) > 0.05 for factor "*Women familiar with the opportunities available for the job in engineering disciplines*". So there is significant difference between the opinions of Employment, Unemployment and female students engineering women in different discipline.
5. P-value (0.054) > 0.05 for factors "*accounting, legal or doctor more attractive and popular for women of being an engineer*". So there is significant difference between the opinions of Employment, Unemployment and female students engineering women in different discipline.
6. P-value (0.217) > 0.05 for factors "*Man has experienced more than women in engineering fields*". So there is significant difference between the opinions of Employment, Unemployment and female students engineering women in different discipline.
7. P-value (0.713) > 0.05 for factor "*my Friends have significant effect the choice of specialization in engineering*". So there is significant difference between the opinions of Employment, Unemployment and female students engineering women in different discipline.
8. P-value (0.727) > 0.05 for factor "*Financially level of my family leads me to study engineering*". So there is significant difference between the opinions of Employment, Unemployment and female students engineering women in different discipline.



### 4.3.7 Group number seven: Discrimination against Women

#### 4.3.7.1 Discipline: Civil engineering women

Table (4.42) show the relative importance indices and ranks of factors of the group number seven " Discrimination against Women" this group contains 9 factors.

Table (4.42) indicated that "*Male discrimination against women refer to their belief that the role of women confined to the home and raising children*" was ranked in first position in overall sample and in female students with RII (81.03), RII (85.00) and ranked in second position in Employment engineering women and in Unemployment engineering women with RII (78.67), RII (92.00). In my opinion women are subjected to sex discrimination while entering to male-dominated work fields. Historically, a woman was first and foremost a wife, whose life was centered in her home and family. This common perception has historically led to women being employed in traditional careers like teaching and nursing.

*"Equality between men and women in obtaining and function increases the popularity of specialty engineering"* was ranked in second position in overall sample and in female students with RII (80.51), RII (80.00), ranked in first position in Employment engineering women with RII (82.00), and ranked in position number four with RII (72.00). This result agreed with Madikizela(2008) result in south Africa study.

*"I have discriminated in my work because I am women"* was ranked in position number eight for overall sample with RII (56.41), ranked in position number nine in Employment engineering women with RII (53.33), ranked in position number five in Unemployment engineering women with RII (68.00), and ranked in position number four in female students with RII (65.00). This result shows that women when choosing civil engineering don't discriminated because they are women.

*"There are those who believe in the proverb (We appreciate women but do not give them a place)"* P-value of this factor is .013 less than 0.05 so there are difference in opinion between all categories of civil engineer since was ranked in first position for Unemployment engineering women that's return to the point of view of them because they don't have work, but for Employment engineering women ranked in position number eight since they found job and take opportunities to creative in their work and return to the confidence in their self.

#### 4.3.7.2 Discipline: Architecture engineering women

Table (4.43) indicated that "*Women wish to have a large number of children are more attracted to other sectors of the engineering*" was ranked in first position in overall sample and in Employment engineering women with RII (78.29), RII (80.00), ranked in position number three in female students with RII (72.00) and ranked in position number four in Unemployment engineering women with RII (76.00). This result shows the effect culture and historical role of women as house waif and mother. This result agreed with Madikizela(2008) result that women who had aspirations of motherhood were more likely to be attracted to other sectors than the construction industry. Also agreed with Dainty et al., (2004) suggested that most women perceived that they had to make a choice between a career and a family-oriented lifestyle and saw little

opportunity for work-life balance. The findings of the study indicated that women who believed that they were meant to only be mothers would not be interested in careers in engineering.

**Table (4.42) Rank and RII of Group number seven: "Discrimination against women" "Civil engineer"**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Male discrimination against women refer to their belief that the role of women confined to the home and raising children.	81.03	1	78.67	2	92.00	2	85.00	1	0.362
Equality between men and women in obtaining and function increases the popularity of specialty engineering.	80.51	2	82.00	1	72.00	4	80.00	2	0.507
Women wish to have a large number of children are more attracted to other sectors of the engineering	75.90	3	74.00	3	84.00	3	80.00	2	0.581
Pregnant engineering women who work in the workplace discrimination suffered the highest percentage compared to other employment sectors.	73.33	4	73.33	4	72.00	4	75.00	3	0.967
Chance of women to get supervisory position in the workplace is unfair.	70.26	5	70.00	5	64.00	6	80.00	2	0.634
Inadequate service facilities such as toilets , ablution and place of prayer	68.72	6	68.67	6	64.00	6	75.00	3	0.709
There are those who believe in the proverb (We appreciate women but do not give them a place).	68.72	6	66.67	7	96.00	1	50.00	5	0.013
The desire to raise the standard of living for my family a major reason for my departure to work	63.59	7	63.33	8	56.00	7	75.00	3	0.487
I have discriminated in my work because I am women.	56.41	8	53.33	9	68.00	5	65.00	4	0.458
<b>All factors</b>	70.94		70.00		74.22		73.89		0.727

"Inadequate service facilities such as toilets, ablution and place of prayer" was ranked in second position in overall sample and Employment engineering women with RII (77.14), RII (76.00), ranked in position number three in Unemployment engineering women with RII (80.00) and in first position in female students sample with RII (80.00) This result shows the importance of facilities in site for engineering women. This result agreed with Warren (2003) result that women choose a career in the engineering if the work environment provides good Employment conditions. In our country, there was still the need of improving the Employment environment further to make the work place more comfortable for female employers.

"I have discriminated in my work because I am women" was ranked in last position for overall sample Employment and female students with RII (57.14), RII (54.40), RII (60.00) and ranked in position number five for Unemployment engineering women with RII (68.00). This factor discussed in page 55.

"Chance of women to get supervisory position in the workplace is unfair" P-value of this factor is 0.020 is less than 0.05 so there is difference between the opinion of all categories of Architecture engineering women since was ranked in second position for Unemployment engineering women that's return to point of view of them because they

don't have work, but for Employment engineering women ranked in position number four since they found job and take opportunities to creative in their work and return to the confidence in their self.

**Table (4.43) Rank and RII of Group number seven: "Discrimination against women" "Architecture engineer"**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Women wish to have a large number of children are more attracted to other sectors of the engineering	78.29	1	80.00	1	76.00	4	72.00	3	0.614
Inadequate service facilities such as toilets , ablution and place of prayer	77.14	2	76.00	2	80.00	3	80.00	1	0.827
Equality between men and women in obtaining and function increases the popularity of specialty engineering.	75.43	3	76.00	2	76.00	4	72.00	3	0.913
There are those who believe in the proverb (We appreciate women but do not give them a place).	73.14	4	71.20	5	84.00	2	72.00	3	0.526
Male discrimination against women refer to their belief that the role of women confined to the home and raising children.	72.57	5	74.40	3	56.00	6	80.00	1	0.177
Chance of women to get supervisory position in the workplace is unfair.	70.86	6	72.00	4	84.00	2	52.00	5	0.020
Pregnant engineering womens who work in the workplace discrimination suffered the highest percentage compare to other employment sectors.	70.86	6	66.40	6	88.00	1	76.00	2	0.050
The desire to raise the standard of living for my family a major reason for my departure to work	64.57	7	60.00	7	80.00	3	72.00	3	0.214
I have discriminated in my work because I am women.	57.14	8	54.40	8	68.00	5	60.00	4	0.515
<b>All factors</b>	71.11		70.04		76.89		70.67		0.413

#### 4.3.7.3 Discipline: Communication engineering women

Table (4.44) indicated that "*There are those who believe in the proverb (We appreciate women but do not give them a place)*" was ranked in first position in overall sample, Unemployment engineering women and female students with RII (77.93), RII (85.00), RII (73.33), and ranked in second position for Employment engineering women with RII (77.27). This factor discussed in page 56.

"*Women wish to have a large number of children are more attracted to other sectors of the engineering*" was ranked in second position in overall sample with RII (75.86), ranked in first position in Employment engineering women with RII (80.00), ranked in third position in Unemployment engineering women with RII (70.00), and ranked in position number four with RII (53.33). This factor discussed in page 56.

"*I have discriminated in my work because I am women*" was ranked in last position in overall sample with RII (59.31), ranked in position number seven in Employment engineering women with RII (59.09), and ranked in position number four in Unemployment engineering women and female students sample with RII (65.00), RII (53.33). This factor discuss in page 56.

**Table (4.44) Rank and RII of Group number seven: "Discrimination against women" "Communication engineer"**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
There are those who believe in the proverb (We appreciate women but do not give them a place).	77.93	1	77.27	2	85.00	1	73.33	1	0.617
Women wish to have a large number of children are more attracted to other sectors of the engineering	75.86	2	80.00	1	70.00	3	53.33	4	0.079
Male discrimination against women refer to their belief that the role of women confined to the home and raising children.	74.48	3	77.27	5	65.00	4	66.67	2	0.329
Equality between men and women in obtaining and function increases the popularity of specialty engineering.	68.97	4	70.00	8	70.00	3	60.00	3	0.738
Chance of women to get supervisory position in the workplace is unfair.	67.59	5	68.18	9	70.00	3	60.00	3	0.764
The desire to raise the standard of living for my family a major reason for my departure to work	66.21	6	69.09	3	60.00	5	53.33	4	0.419
Inadequate service facilities such as toilets , ablution and place of prayer	64.14	7	66.36	6	60.00	5	53.33	4	0.518
Pregnant engineering womens who work in the workplace discrimination suffered the highest percentage compared to other employment sectors.	64.14	7	62.73	4	75.00	2	60.00	3	0.317
I have discriminated in my work because I am women.	59.31	8	59.09	7	65.00	4	53.33	4	0.777
<b>All factors</b>	<b>68.74</b>		<b>70.00</b>		<b>68.89</b>		<b>59.26</b>		<b>0.312</b>

#### 4.3.7.4 Discipline: Computer engineering women

**Table (4.45) Rank and RII of Group number seven: "Discrimination against Women" "Computer engineer"**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Male discrimination against women refer to their belief that the role of women confined to the home and	75.38	1	73.79	2	55.00	4	79.38	1	0.032
Women wish to have a large number of children are more attracted to other sectors of the engineering	68.92	2	76.55	1	45.00	5	65.00	5	0.007
Inadequate service facilities such as toilets , ablution and place of prayer	67.69	3	68.28	4	45.00	5	70.00	2	0.020
Equality between men and women in obtaining and function increases the popularity of specialty.	67.38	4	67.59	5	85.00	1	65.00	5	0.136
Pregnant engineering women who work in the workplace discrimination suffered the highest	66.77	5	68.28	4	60.00	3	66.25	3	0.593
Chance of women to get supervisory position in the workplace is unfair.	64.92	6	70.34	3	55.00	4	61.25	6	0.197
The desire to raise the standard of living for my family a major reason for my departure to work	63.69	7	60.00	7	75.00	2	65.63	4	0.344
There are those who believe in the proverb (We appreciate women but do not give them a place).	62.15	8	63.45	6	60.00	3	61.25	6	0.912
I have discriminated in my work because I am women.	55.08	9	56.55	8	45.00	5	55.00	7	0.465
<b>All factors</b>	<b>65.78</b>		<b>67.20</b>		<b>58.33</b>		<b>65.42</b>		<b>0.323</b>

Table (4.45) indicated that "*Male discrimination against women refer to their belief that the role of women confined to the home and raising children*" was ranked in first position in overall sample and in female students with RII (75.38), RII (79.38), ranked in second position in Employment engineering women with RII (73.79), and ranked in position number four in Unemployment engineering women with RII (55.00). P-value of this factor is 0.032 is less than 0.05 so there is difference between opinion of all categories of computer engineering women. The result confirmed that males believed that traditional roles and cultural beliefs played a major role in the careers choices of women.

"*Women wish to have a large number of children are more attracted to other sectors of the engineering*" was ranked in second position for overall sample with RII (68.92), ranked in first position in Employment engineering women with RII (76.55) and ranked in position number five in Unemployment engineering women and in female students with RII (45.00), RII (65.00). P-value of this factor is 0.007 is less than 0.05 so there is difference between opinion of all categories of computer engineering women. This factor discussed in page 56.

"*Inadequate service facilities such as toilets, ablution and place of prayer*" was ranked in position number three in overall sample with RII (67.69), ranked in second position in Employment engineering women with RII (70.00), ranked in position number four in Unemployment engineering women with RII (68.28), and ranked in position five in female students with RII (45.00). P-value of this factor is 0.020 is less than 0.05 so there is difference between opinion of all categories of computer engineering women. This factor discuss above.

"*I have discriminated in my work because I am women*" was ranked in last position for all categories of computer engineering women. This factor discussed in page 56.

#### **4.3.7.5 Discipline: Industry engineering women**

Table (4.46) indicated that "*Chance of women to get supervisory position in the workplace is unfair*" was ranked in first position for overall sample and in female students with RII (80.00), RII (100.00), ranked in second position in Unemployment engineering women with RII (80.00) and ranked in third position in Employment engineering women with RII (70.00). This factor discussed in page 56.

"*Inadequate service facilities such as toilets, ablution and place of prayer*" was ranked in first position in overall sample and in Employment engineering women with RII (80.00), RII (80.00), ranked in second position in Unemployment engineering women and in female students with RII (80.00), RII (80.00). This factor discussed in page 56.

"*There are those who believe in the proverb (We appreciate women but do not give them a place)*" was ranked in last position for overall sample Unemployment engineering women with RII(57.14), RII (40.00), ranked in position number five in Employment engineering women with RII (60.00) and ranked in third position in female students RII (60.00). This factor discussed in page 56.

**Table (4.46) Rank and RII of Group number seven: "Discrimination against Women" "Industry engineer"**

Statement	Over all sample		Employment engineering women		Unemployment Engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Chance of women to get supervisory position in the workplace is unfair.	80.00	1	70.00	3	80.00	2	100.00	1	0.063
Inadequate service facilities such as toilets , ablution and place of prayer	80.00	1	80.00	1	80.00	2	80.00	2	1.000
Male discrimination against women refer to their belief that the role of women confined to the home and raising children.	71.43	2	75.00	2	40.00	3	80.00	2	0.379
Equality between men and women in obtaining and function increases the popularity of specialty engineering.	71.43	2	80.00	1	100.00	1	40.00	4	0.191
Pregnant engineering womens who work in the workplace discrimination suffered the highest percentage compared to other employment sectors.	71.43	2	65.00	4	80.00	2	80.00	2	0.548
The desire to raise the standard of living for my family a major reason for my departure to work	68.57	3	70.00	3	80.00	2	60.00	3	0.652
Women wish to have a large number of children are more attracted to other sectors of the engineering	62.86	4	70.00	3	40.00	3	60.00	3	0.381
I have discriminated in my work because I am women.	57.14	5	50.00	6	40.00	3	80.00	2	0.319
There are those who believe in the proverb (We appreciate women but do not give them a place).	57.14	5	60.00	5	40.00	3	60.00	3	0.848
<b>All factors</b>	<b>68.89</b>		<b>68.89</b>		<b>64.44</b>		<b>71.11</b>		<b>0.899</b>

### 4.3.5.6 Comparison for each discipline

Table (4.47) comparison for each discipline related to the group number seven "Discrimination against women"

Ranked	Civil	RII	Architecture	RII	Communication	RII	Computer	RII	Industry	RII
1	Male discrimination against women refer to their belief that the role of women confined to the home and raising children.	81.03	Women wish to have a large number of children are more attracted to other sectors of the engineering	78.29	There are those who believe in the proverb (We appreciate women but do not give them a place).	77.93	Male discrimination against women refer to their belief that the role of women confined to the home and raising children.	75.38	Chance of women to get supervisory position in the workplace is unfair.	80.00
2	Equality between men and women in obtaining and function increases the popularity of specialty engineering.	80.51	Inadequate service facilities such as toilets , ablution and place of prayer	77.14	Women wish to have a large number of children are more attracted to other sectors of the engineering	75.86	Women wish to have a large number of children are more attracted to other sectors of the engineering	68.92	Inadequate service facilities such as toilets , ablution and place of prayer	80.00
3	Women wish to have a large number of children are more attracted to other sectors of the engineering	75.90	Equality between men and women in obtaining and function increases the popularity of specialty engineering.	75.43	Male discrimination against women refer to their belief that the role of women confined to the home and raising children.	74.48	Inadequate service facilities such as toilets , ablution and place of prayer	67.69	Male discrimination against women refer to their belief that the role of women confined to the home and raising children.	71.43
4	Pregnant engineering women who work in the workplace discrimination suffered the highest percentage compared to other employment sectors.	73.33	There are those who believe in the proverb (We appreciate women but do not give them a place).	73.14	Equality between men and women in obtaining and function increases the popularity of specialty engineering.	68.97	Equality between men and women in obtaining and function increases the popularity of specialty engineering.	67.38	Equality between men and women in obtaining and function increases the popularity of specialty engineering.	71.43
5	Chance of women to get supervisory position in the workplace is unfair.	70.26	Male discrimination against women refer to their belief that the role of women confined to the home and raising children.	72.57	Chance of women to get supervisory position in the workplace is unfair.	67.59	Pregnant engineering women who work in the workplace discrimination suffered the highest percentage compared to other employment sectors.	66.77	Pregnant engineering women who work in the workplace discrimination suffered the highest percentage compared to other employment sectors.	71.43
6	Inadequate service facilities such as toilets , ablution and place of prayer	68.72	Chance of women to get supervisory position in the workplace is unfair.	70.86	The desire to raise the standard of living for my family a major reason for my departure to work	66.21	Chance of women to get supervisory position in the workplace is unfair.	64.92	The desire to raise the standard of living for my family a major reason for my departure to work	68.57
7	There are those who believe in the proverb (We appreciate women but do not give them a place).	68.72	Pregnant engineering women who work in the workplace discrimination	70.86	Inadequate service facilities such as toilets , ablution and place of prayer	64.14	The desire to raise the standard of living for my family a major reason for	63.69	Women wish to have a large number of children are more attracted to	62.86

**Table (4.47) comparison for each discipline related to the group number seven "Discrimination against women"**

Ranked	Civil	RII	Architecture	RII	Communication	RII	Computer	RII	Industry	RII
			suffered the highest percentage compare to other employment sectors.				my departure to work		other sectors of the engineering	
8	The desire to raise the standard of living for my family a major reason for my departure to work	63.59	The desire to raise the standard of living for my family a major reason for my departure to work	64.57	Pregnant engineering women who work in the workplace discrimination suffered the highest percentage compared to other employment sectors.	64.14	There are those who believe in the proverb (We appreciate women but do not give them a place).	62.15	I have discriminated in my work because I am women.	57.14
9	I have discriminated in my work because I am women.	56.41	I have discriminated in my work because I am women.	57.14	I have discriminated in my work because I am women.	59.31	I have discriminated in my work because I am women.	55.08	There are those who believe in the proverb (We appreciate women but do not give them a place).	57.14



From table (4.47) "*Male discrimination against women refer to their belief that the role of women confined to the home and raising children*" was ranked in first position for civil and computer engineering women, also ranked in second position for industry engineering women, also ranked in third position for communication engineering women and ranked in position number five for architect engineering women. From this result notes that the agreement of this factor of civil engineer is very huge this return to the nature of work in site and contact with men rather than any discipline of engineer, in other hand Architecture engineering women Employment in office not in site so contact with men is very rare so his factor has small effect Architecture engineering women when choices her career. Women have an important role in family as well as in society. Naturally, there have been sexual and physical differences between women and men. Pregnancy, motherhood including birth and suckle phases affect their Employment life as their whole life. Especially, Employment in positions requiring physical strength or Employment in dangerous and tiring environment might cause inconveniences for women's and their child's health. Since woman place is in the home this is common perception, so in our society all family responsibilities is located on the women, if the women is employment out the home or not. Family responsibilities are like children care, cooking, clean housing, visit relatives; engage in social network of the family, and other responsibility. There is no excuse for Employment women by a husband and society. And there is no co-operation between men and women in social life. Also, our society does not include places equipped and cheap to take care of children and considered this an obstacle to Employment women's. Only very few women occupied important jobs.

*"Equality between men and women in obtaining and function increases the popularity of specialty engineering"* was ranked in second position for civil and industry engineer, also ranked in third position for architect engineer and ranked in position number four for communication and computer engineer. This result indicated that civil and industry support this factor but communication and computer engineer ranked in late position since most of them work in teaching and studying another discipline.

*"Women wish to have a large number of children are more attracted to other sectors than engineering"* was ranked in third position for civil engineering women also ranked in first position for architect engineer also ranked in second position for communication and computer and ranked in position number four for industry engineering women. This result agreed with South Africa study that women who had aspirations of motherhood were more likely to be attracted to other sectors than the construction industry.

*"Pregnant engineering women who work in the workplace discrimination suffered the highest percentage compared to other employment sectors"* was ranked in position number four for civil engineer also ranked in position number five for computer engineering women also ranked in position number six for architect engineering women and ranked in second position for industry engineering women. From my work in note the discrimination against pregnant women in different discipline.

*"Chance of women to get supervisory position in the workplace is unfair"* was ranked in position number five for civil and communication engineer also ranked in position number six for architect and computer engineer and ranked in first position for industry engineering women. This result agreed with Lauer (2010) result that women are less likely than men to achieve high-status positions or to move into management.

"Inadequate service facilities such as toilets, ablution and place of prayer" was ranked in position number six for civil engineer, also ranked in third position for computer engineer also ranked in second position for architect engineer also ranked in first position for industry engineering women. This result shows the importance of facilities in site for engineering women. This result agreed with Warren (2003) result that women choose a career in the engineering if the work environment provides good Employment conditions. In our country, there was still the need of improving the Employment environment further to make the work place more comfortable for female employers.

"The desire to raise the standard of living for my family a major reason for my departure to work" was ranked in position number seven for civil, Architecture and computer engineering women also ranked in position number six for communication engineering women and ranked in third position for industry engineering women. This factor has low effect and agreement from engineering women in different engineering discipline.

"I have discriminated in my work because I am women" was ranked in last position for all discipline of engineer. This factor was not effect engineering women in different engineering discipline.

#### 4.3.5.7 Hypotheses number five tested in this research are

- Null hypothesis(Ho): Discrimination against women discourages women from choosing career in engineer(at .05 level).
- Alternative hypothesis (H1): Discrimination against women encourages women from choosing career in engineer (at .05 levels).

Table 4.48 indicated that P-value (0.369) > 0.05 for overall sample as whole, but there are several factors inside this group have P-value < 0.05. Thus, null hypothesis is rejected, alternative hypothesis is substantiated for the phase as whole, and null hypothesis is substantiated for some factors.

As mentioned above that the null hypothesis is substantiated for some factors, this partially substantiated from the significant difference (at level 0.05) between the opinions of Employment, Unemployment and female students engineering women in different discipline. These factors are:

1. P-value (0.005) < 0.05 for factor "Women wish to have a large number of children are more attracted to other sectors of the engineering". So there is significant difference between the opinions of Employment, Unemployment and female students engineering women in different discipline.]
2. P-value (0.025) < 0.05 for factor "Equality between men and women in obtaining and function increases the popularity of specialty engineering". So there is significant difference between the opinions of Employment, Unemployment and female students engineering women in different discipline.
3. P-value (0.016) < 0.05 for factor "There are those who believe in the proverb (We appreciate women but do not give them a place)". So there is significant

difference between the opinions of Employment, Unemployment and female students engineering women in different discipline.

**Table (4.48) Discrimination against women of overall sample of all discipline of engineering women Employment in the field of engineering**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Male discrimination against women refer to their belief that the role of women confined to the home and raising children.	75.77	1	76.00	2	66.32	6	79.13	1	0.055
Women wish to have a large number of children are more attracted to other sectors of the engineering	73.26	2	77.09	1	68.42	5	66.09	4	0.005
Equality between men and women in obtaining and function increases the popularity of specialty engineering.	72.34	3	74.36	3	76.84	2	65.65	6	0.025
Inadequate service facilities such as toilets , ablution and place of prayer	69.71	4	70.18	4	64.21	7	70.87	2	0.385
Pregnant engineering women who work in the workplace discrimination suffered the highest percentage compared to other employment sectors.	68.80	5	68.00	6	74.74	3	68.26	3	0.260
Chance of women to get supervisory position in the workplace is unfair.	68.34	6	70.18	4	69.47	4	63.48	7	0.207
There are those who believe in the proverb (We appreciate women but do not give them a place).	68.23	7	68.73	5	80.00	1	62.17	8	0.016
The desire to raise the standard of living for my family a major reason for my departure to work	64.46	8	63.09	7	68.42	5	66.09	5	0.539
I have discriminated in my work because I am women.	56.57	9	55.45	8	61.05	8	57.39	9	0.573
<b>All factors</b>	68.61		69.23		69.94		66.57		0.369

### 4.3.8 Group number eight: Historical role of women

#### 4.3.8.1 Discipline: Civil engineering women

Table (4.49) show the relative importance indices and ranks of factors of the group number seven " *Historical role of women* " this group contains 6 factors.

Table (4.49) indicated that "*The historical role played by women and men in society make men less receptive to their women colleagues*" was ranked in first position in overall sample, Employment and in Unemployment engineering women with RII (63.59), RII (62.00), and RII (76.00) and ranked in second position in female students with RII (60.00). This result agreed with Greed (2000), Jayne et al. (1999), Fielden et al. (2000).

"*A man more suited than women's for disciplines of engineering*" was ranked in second position in overall sample, Employment engineering women, and female students with RII (58.97), RII (61.33), RII (60.00) and ranked in position number four in

Unemployment engineering women with RII (44.00). This result agreed with Matope (2007), (Clarke et al., 2005), Aulin and Jingmond (2011), Cunningham (2001)

"The high cost of engineering study impact on my decision to choice Engineering" was ranked in position number five for overall sample and in female students with RII (42.05), RII (35.00), ranked in third position in Unemployment engineering women with RII (48.00) and ranked in position number six in Employment engineering women with RII (42.00). This result means that the low effects of this factor when women choose her career in engineering.

**Table (4.49) Rank and RII of Group number eight: "Historical role of women" "Civil engineer"**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
The historical role played by women and men in society make men less receptive to their women colleagues.	63.59	1	62.00	1	76.00	1	60.00	2	0.420
A man more suited than women's for disciplines of engineering.	58.97	2	61.33	2	44.00	4	60.00	2	0.269
I would encourage other women to choose Employment sectors other than engineering.	54.87	3	57.33	3	40.00	5	55.00	3	0.341
Lack of job opportunities in the future leads me to study another profession.	53.33	4	51.33	5	68.00	2	50.00	4	0.336
Women over forty years old are not appropriate for work in your field as men in the same age.	53.33	4	54.00	4	40.00	5	65.00	1	0.264
The high cost of engineering study impact on my decision to choice Engineering.	42.05	5	42.00	6	48.00	3	35.00	5	0.449
<b>All factors</b>	54.36		54.67		52.67		54.17		0.951

#### 4.3.8.2 Discipline: Architecture engineering women

**Table (4.50) Rank and RII of Group number eight: "Historical role of women" "Architecture engineer"**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
The historical role played by women and men in society make men less receptive to their women colleagues.	61.71	1	60.80	1	56.00	3	72.00	1	0.408
I would encourage other women to choose Employment sectors other than engineering.	58.29	2	54.40	4	76.00	1	60.00	3	0.142
Women over forty years old are not appropriate for work in your field as men in the same age.	57.71	3	54.40	4	68.00	2	64.00	2	0.465
Lack of job opportunities in the future leads me to study another profession.	54.86	4	57.60	2	48.00	6	48.00	5	0.590
A man more suited than women's for disciplines of engineering.	54.86	4	56.00	3	52.00	5	52.00	4	0.882
The high cost of engineering study impact on my decision to choice Engineering.	41.71	5	42.40	5	32.00	7	48.00	5	0.288
<b>All factors</b>	54.86		54.27		55.33		57.33		0.858

Table (4.55) indicated that *"The historical role played by women and men in society make men less receptive to their women colleagues"* was ranked in first position in overall sample, Employment engineering women, and in female students with RII (61.71), RII (60.80), and RII (72.00) and ranked in third position in Unemployment engineering women with RII (56.00). This factor discussed in page 65.

*"I would encourage other women to choose Employment sectors other than engineering"* was ranked in second position in overall sample with RII (58.29), ranked in position number four in Employment engineering women with RII (54.40), ranked in first position in Unemployment engineering women with RII (76.00) and ranked in third position in female students with RII (60.00). This result disagreed with Madikizela (2008) study in south Africa found that as the male female students progressed in their studies their feelings about women choosing construction as a career became more negative, and that they would not encourage women to choose construction as a career. The study found that very few female students would actually encourage other women to consider careers in construction.

*"The high cost of engineering study impact on my decision to choice Engineering"* was ranked in last position in all categories of Architecture engineering women Employment, Unemployment engineering women, female students and overall sample. Result means that the low effects of this factor when women choose her career in engineering. This factor discuss above.

#### 4.3.8.3 Discipline: Communication engineering women

**Table (4.51) Rank and RII of Group number eight: "Historical role of women" "Communication engineer"**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Lack of job opportunities in the future leads me to study another profession.	64.14	1	59.09	3	95.00	1	60.00	2	0.053
I would encourage other women to choose Employment sectors other than engineering.	63.45	2	60.00	2	85.00	2	60.00	2	0.154
The historical role played by women and men in society make men less receptive to their women colleagues.	62.07	3	62.73	1	60.00	4	60.00	2	0.933
Women over forty years old are not appropriate for work in your field as men in the same age.	60.69	4	59.09	3	65.00	3	66.67	1	0.777
A man more suited than women's for disciplines of engineering.	58.62	5	56.36	4	65.00	3	66.67	1	0.572
The high cost of engineering study impact on my decision to choice Engineering.	43.45	6	40.00	5	50.00	5	60.00	2	0.008
<b>All factors</b>	58.74		56.21		70.00		62.22		0.112

Table (4.51) indicated that *"Lack of job opportunities in the future leads me to study another profession"* was ranked in first position in overall sample, Unemployment engineering women with RII (64.14), RII (95.00), ranked in second position in female students with RII (60.00) and ranked in third position in Employment engineering women with RII (59.09). This result indicted that bad situation of communication engineer in Gaza strip sine the big company like Jawwal doesn't have any engineering

women and communication company have only 4 engineering women this indict that there is no job opportunities for communication engineer this lead them to study mathematics and physics. In 2012, In the Gaza Strip Bulletin Engineers Association disclaimer to high school female students to think carefully before studying engineering for lack of employment opportunities, and increase the number of engineers don't work in the Gaza Strip and in the same disclaimer has published the number of engineers who are Employment and the number of engineers don't work, in a reference to the importance of finding jobs after studying.

"I would encourage other women to choose Employment sectors other than engineering" was ranked in second position in overall sample, Employment, Unemployment engineering women and in female students with RII (63.45), RII (60.00), RII (85.00), RII (60.00) this factor discussed in page 65.

"The high cost of engineering study impact on my decision to choice engineering" was ranked in last position for all categories of communication engineering women overall sample, Employment, and Unemployment engineering women and in female students. Result means that the low effects of this factor when women choose her career in engineering. This factor discussed in page 65.

#### 4.3.8.4 Discipline: Computer engineering women

Table (4.52) Rank and RII of Group number eight: "Historical role of women" "Computer engineer"

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
The historical role played by women and men in society make men less receptive to their women colleagues.	67.38	1	71.72	1	70.00	1	63.13	1	0.153
Women over forty years old are not appropriate for work in your field as men in the same age.	59.08	2	59.31	3	55.00	3	59.38	2	0.933
I would encourage other women to choose Employment sectors other than engineering.	57.23	3	55.86	5	60.00	2	58.13	3	0.887
A man more suited than women's for disciplines of engineering.	54.77	4	56.55	4	50.00	4	53.75	4	0.742
Lack of job opportunities in the future leads me to study another profession.	53.85	5	62.07	2	55.00	3	46.25	5	0.016
The high cost of engineering study impact on my decision to choice Engineering.	48.31	6	52.41	6	45.00	5	45.00	6	0.259
<b>All factors</b>	<b>56.77</b>		<b>59.66</b>		<b>55.83</b>		<b>54.27</b>		<b>0.320</b>

Table (4.52) indicated that "The historical role played by women and men in society make men less receptive to their women colleagues" was ranked in first position in all categories of computer engineering women with RII (67.38), RII (71.72), RII (70.00), and RII (63.13). This factor discussed in page 65.

"Women over forty years old are not appropriate for work in your field as men in the same age" was ranked in second position in overall sample and in female students with RII (59.08), RII (59.38), ranked in third position in Employment and Unemployment

engineering women with RII (59.31), RII (55.00). This result agreed with Madikizela (2008) study in South Africa result that there was agreement that women were not as physically capable as men. Also it was agreed that older women were less suited to the physical job than men of equal age.

"The high cost of engineering study impact on my decision to choice Engineering" was ranked in last position in all categories of computer engineering women Employment, Unemployment engineering women, female students and overall sample. Result means that the low effects of this factor when women choose her career in engineering. This factor discussed in page 65.

"Lack of job opportunities in the future leads me to study another profession" P-value of this factor 0.016 is less than 0.05 so there is difference in opinion between all categories of computer engineer since was ranked in second position in Employment engineering women that's return to point of view of them because they work and exam Employment as engineer how the difficult of responsibility of Employment and the sensitivity of work.

#### 4.3.8.5 Discipline: Industry engineering women

Table (4.53) Rank and RII of Group number eight: "Historical role of women" "Industry engineer"

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
The high cost of engineering study impact on my decision to choice Engineering.	54.29	1	65.00	1	40.00	1	40.00	3	0.257
The historical role played by women and men in society make men less receptive to their women colleagues.	51.43	2	55.00	2	20.00	2	60.00	2	0.232
Lack of job opportunities in the future leads me to study another profession.	48.57	3	55.00	2	40.00	1	40.00	3	0.766
Women over forty years old are not appropriate for work in your field as men in the same age.	48.57	3	35.00	4	40.00	1	80.00	1	0.080
A man more suited than women's for disciplines of engineering.	45.71	4	55.00	2	20.00	2	40.00	3	0.048
I would encourage other women to choose working sectors other than engineering.	45.71	4	50.00	3	40.00	1	40.00	3	0.766
<b>All factors</b>	49.05		52.50		33.33		50.00		0.082

Table (4.53) indicated that "The high cost of engineering study impact on my decision to choice Engineering" was ranked in first position in overall sample, Employment, Unemployment engineering women with RII (54.29), RII (65.00) and RII (40.00) and ranked in third position in female students with RII (40.00). This factor discussed in page 65.

"The historical role played by women and men in society make men less receptive to their women colleagues" was ranked in second position in overall sample, Employment, Unemployment engineering women and in female students with RII (54.29), RII (65.00) and RII (40.00), RII (40.00). This factor discussed in page 65.

"A man more suited than women's for disciplines of engineering" P-value of this factor is 0.048 is less than 0.05 so there is difference between the opinion of overall sample, Employment , Unemployment engineering women and in female students opinion this return to the experience of them in work environment. This factor discussed in page 65.

"I would encourage other women to choose Employment sectors other than engineering" was ranked in last position for overall sample, Employment engineering women and in female students with RII (45.71), RII (50.00) and RII (40.00) and ranked in first position for Unemployment engineering women with RII (40.00). This factor discussed in page 65.

Table (4.54) indicated that "The historical role played by women and men in society make men less receptive to their women colleagues" was ranked in first position for civil, Architecture, computer and industry engineering women and ranked in second position for communication engineering women. This result agreed with Greed (2000), Jayne et al. (1999), Fielden et al. (2000)

"A man more suited than women's for disciplines of engineering" was ranked in second position for civil engineer also ranked in position number four for architect, computer and industry engineering women and ranked in position number four for communication engineering women. This result is return to the difference of work nature task that women do it.

"I would encourage other women to choose Employment sectors other than engineering" was ranked in third position for civil and computer engineer also ranked in second position for architect and communication engineering women and ranked in position number four for industry engineering women.

"Lack of job opportunities in the future leads me to study another profession" was ranked in position number four for civil and Architecture engineering women, also ranked in third position for industry engineering women also ranked in position number five and ranked in first position for communication engineering women. This result indicted that bad situation of communication engineer in Gaza strip sine the big company like Jawwal doesn't have any engineering women and communication company have only 4 engineering women this indict that there is no job opportunities for communication engineer this lead them to study mathematics and physics.

"Women over forty years old are not appropriate for work in your field as men in the same age" was ranked in position number four for civil and communication engineering women also ranked in second position for computer engineering women and ranked in third position for architect and industry engineering women. This result agreed with Madikizela (2008) study in South Africa result that there was agreement that women were not as physically capable as men. Also this result agreed that older women were less suited to the physical job than men of equal age.

"The high cost of engineering study impact on my decision to choice Engineering" was ranked in last position for civil, Architecture, communication and computer engineering women and ranked in first position for industry engineering women. Result means that the low effects of this factor when women choose her career in engineering.



### 4.3.8.6 Comparison for each discipline

**Table (4.54) comparison for each discipline related to the group number eight "Historical role of women"**

Ranked	Civil	RII	Architecture	RII	Communication	RII	Computer	RII	Industry	RII
1	The historical role played by women and men in society make men less receptive to their women colleagues.	63.59	The historical role played by women and men in society make men less receptive to their women colleagues.	61.71	Lack of job opportunities in the future leads me to study another profession.	64.14	The historical role played by women and men in society make men less receptive to their women colleagues.	67.38	The high cost of engineering study impact on my decision to choice Engineering.	54.29
2	A man more suited than women's for disciplines of engineering.	58.97	I would encourage other women to choose Employment sectors other than engineering.	58.29	I would encourage other women to choose Employment sectors other than engineering.	63.45	Women over forty years old are not appropriate for work in your field as men in the same age.	59.08	The historical role played by women and men in society make men less receptive to their women colleagues.	51.43
3	I would encourage other women to choose Employment sectors other than engineering.	54.87	Women over forty years old are not appropriate for work in your field as men in the same age.	57.71	The historical role played by women and men in society make men less receptive to their women colleagues.	62.07	I would encourage other women to choose Employment sectors other than engineering.	57.23	Lack of job opportunities in the future leads me to study another profession.	48.57
4	Lack of job opportunities in the future leads me to study another profession.	53.33	Lack of job opportunities in the future leads me to study another profession.	54.86	Women over forty years old are not appropriate for work in your field as men in the same age.	60.69	A man more suited than women's for disciplines of engineering.	54.77	Women over forty years old are not appropriate for work in your field as men in the same age.	48.57
5	Women over forty years old are not appropriate for work in your field as men in the same age.	53.33	A man more suited than women's for disciplines of engineering.	54.86	A man more suited than women's for disciplines of engineering.	58.62	Lack of job opportunities in the future leads me to study another profession.	53.85	A man more suited than women's for disciplines of engineering.	45.71
6	The high cost of engineering study impact on my decision to choice Engineering.	42.05	The high cost of engineering study impact on my decision to choice Engineering.	41.71	The high cost of engineering study impact on my decision to choice Engineering.	43.45	The high cost of engineering study impact on my decision to choice Engineering.	48.31	I would encourage other women to choose Employment sectors other than engineering.	45.71

### 4.3.9 Group number nine: Culture

#### 4.3.9.1 Discipline: Civil engineering women

Table (4.55) show the relative importance indices and ranks of factors of the group number nine " **Culture** " this group contains 6 factors.

**Table (4.55) Rank and RII of Group number nine: "Culture" "Civil engineer"**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Women in the workplace are respected as a man.	70.26	1	70.67	1	60.00	4	80.00	1	0.459
Customs and tradition play a major role in the decision to specialize in engineering.	69.74	2	68.00	2	88.00	1	60.00	3	0.118
The women can do everything as well as for men.	68.21	3	68.00	3	72.00	2	65.00	2	0.871
Engineers subjected to verbal flirting and harassment at work.	62.05	4	58.67	4	68.00	3	80.00	1	0.309
Employment women in the field of engineering does not have the opportunity to develop the same as her male colleagues.	45.13	5	45.33	5	52.00	5	35.00	5	0.575
Provide grants and university loans impact on my choice of Engineering.	43.59	6	44.67	6	40.00	6	40.00	4	0.782
<b>All factors</b>	<b>59.83</b>		<b>59.22</b>		<b>63.33</b>		<b>60.00</b>		<b>0.695</b>

Table (4.55) indicated that "*Women in the workplace are respected as a man*" was ranked in first position in overall sample, Employment engineering women, and female students with RII (70.26), RII (70.67) and RII (80.00) and ranked position number four in Unemployment engineering women with RII (60.00). Unemployment engineering women take late ranking that's return to point of view of them because they don't have work, but for Employment engineering women ranked in position number first since they found job and take opportunities to creative in their work and return to the confidence in their self and exam work environment. This result disagreed with Madikizela(2008) result in south Africa that women on workplace were not respected to same extent as men and those they were intimidated by the fact that there were more male Employment s in construction and disagreed with Perreault (1992) result that women are not taken seriously by subordinate men.

"*Customs and tradition play a major role in the decision to specialize in engineering*" was ranked in second position in overall sample and Employment women with RII (69.74) and RII (68.00), ranked in first position in Unemployment engineering women with RII (88.00) and ranked in third position in female students sample with RII (60.00). This result agreed with Taylor(2010) result that culture has a major influence on why women have chosen or been restricted from choosing different discipline of engineering.

"*Provide grants and university loans impact on my choice of Engineering*" was ranked position number six "last position" in overall sample, Employment , Unemployment engineering women with RII (43.59), RII (44.67) and RII (40.00) and ranked in position

number four in female students with RII (40.00). This result indicate the low effects of grants and university loans on women when choice her career.

#### 4.3.9.2 Discipline: Architecture engineering women

**Table (4.56) Rank and RII of Group number nine: "Culture" "Architecture engineer"**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Women in the workplace are respected as a man.	71.43	1	74.40	1	72.00	3	56.00	3	0.215
The man can do everything as well as for women.	65.14	2	61.60	3	84.00	1	64.00	2	0.136
Customs and tradition play a major role in the decision to specialize in engineering.	64.57	3	64.80	2	64.00	4	64.00	2	0.996
Engineers subjected to verbal flirting and harassment at work.	58.29	4	57.60	4	52.00	5	68.00	1	0.505
Employment women in the field of engineering does not have the opportunity to develop the same as her male colleagues.	54.29	5	52.00	5	76.00	2	44.00	5	0.086
Provide grants and university loans impact on my choice of Engineering.	40.57	6	41.60	6	28.00	6	48.00	4	0.205
<b>All factors</b>	59.05		58.67		62.67		57.33		0.649

Table (4.56) indicated that "*Women in the workplace are respected as a man*" was ranked in first position in overall sample and in Employment engineering women with RII (71.43) and RII (74.40) and ranked in third position in Unemployment engineering women and female students sample of Architecture engineering women with RII (72.00) and RII (56.00). This factor discussed in page 73.

"*The women can do everything as well as for man*" was ranked in second position in overall sample and in female students sample with RII (65.14) and RII (64.00), ranked in first position in Unemployment engineering women with RII (84.00) and ranked in third position with RII (61.60). This result disagreed with Matope (2007), (Clarke et al., 2005) and Aulin, Jingmond (2011)

"*Provide grants and university loans impact on my choice of Engineering*" was ranked position number six "last position" in overall sample, Employment and in Unemployment engineering women with RII (40.57), RII (41.60) and RII (28.00) and ranked in position number four in female students with RII (48.00). This result indicate the low effects of grants and university loans on women when choice her career. This factor discuss above.

#### 4.3.9.3 Discipline: Communication engineering women

Table (4.57) indicated that "*Women in the workplace are respected as a man*" was ranked in first position in all categories of communication engineer. This factor discussed in page 72.

"*Customs and tradition play a major role in the decision to specialize in engineering*" was ranked in second position in overall sample, Employment engineering women and

in female students with RII (66.90), RII (68.18) and RII (60.00) and ranked in first position in Unemployment engineering women with RII (65.00). This factor discussed in page 72.

"Provide grants and university loans impact on my choice of Engineering" was ranked in last position in all categories of communication engineering women.

**Table (4.57) Rank and RII of Group number nine: "Culture" "Communication engineer"**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Women in the workplace are respected as a man.	71.72	1	73.64	1	65.00	2	66.67	1	0.587
Customs and tradition play a major role in the decision to specialize in engineering.	66.90	2	68.18	2	65.00	2	60.00	2	0.801
Engineers subjected to verbal flirting and harassment at work.	58.62	3	59.09	3	60.00	3	53.33	3	0.853
Employment women in the field of engineering does not have the opportunity to develop the same as her male colleagues.	57.93	4	59.09	3	45.00	4	66.67	1	0.466
The man can do everything as well as for women.	57.93	4	56.36	4	70.00	1	53.33	3	0.414
Provide grants and university loans impact on my choice of Engineering.	44.83	5	42.73	5	50.00	4	53.33	3	0.482
<b>All factors</b>	59.66		59.85		59.17		58.89		0.968

#### 4.3.9.4 Discipline: Computer engineering women

**Table (4.58) Rank and RII of Group number nine: "Culture" "Computer engineer"**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
The women can do everything as well as for men.	66.46	1	71.03	1	60.00	2	63.13	4	0.226
Women in the workplace are respected as a man.	65.85	2	66.90	3	70.00	1	64.38	2	0.787
Customs and tradition play a major role in the decision to specialize in engineering.	65.23	3	69.66	2	45.00	4	63.75	3	0.068
Engineers subjected to verbal flirting and harassment at work.	62.77	4	60.69	4	50.00	3	66.25	1	0.178
Employment women in the field of engineering does not have the opportunity to develop the same as her male colleagues.	53.54	5	60.00	5	50.00	3	48.13	6	0.104
Provide grants and university loans impact on my choice of Engineering.	49.54	6	48.28	6	50.00	3	50.63	5	0.893
<b>All factors</b>	60.56		62.76		54.17		59.38		0.086

Table (4.58) indicated that "The women can do everything as well as for men" was ranked in first position in overall sample and Employment engineering women with RII (66.46) and RII (71.03), ranked in second position in Unemployment engineering women with RII (60.00) and ranked in position number four in female students with RII (63.13). This factor discussed in page 72.

"Women in the workplace are respected as a man" was ranked in second position in overall sample and in Employment engineering women with RII (65.85) and RII (64.38), ranked in first position in Unemployment engineering women with RII (70.00) and ranked in third position in female students with RII (66.90). This factor discuss above.

"Provide grants and university loans impact on my choice of Engineering" was ranked in last position for all categories of computer engineering women. This factor discussed in page 72.

#### 4.3.9.5 Discipline: Industry engineering women

Table (4.59) Rank and RII of Group number nine: "Culture" "Industry engineer"

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Customs and tradition play a major role in the decision to specialize in engineering.	71.43	1	70.00	1	20.00	3	100.00	1	0.048
Women in the workplace are respected as a man.	60.00	2	65.00	2	40.00	2	60.00	3	0.766
Provide grants and university loans impact on my choice of Engineering.	60.00	2	65.00	2	40.00	2	60.00	3	0.473
The man can do everything as well as for women.	51.43	3	50.00	3	80.00	1	40.00	4	0.420
Employment women in the field of engineering does not have the opportunity to develop the same as her male colleagues.	48.57	4	40.00	4	20.00	3	80.00	2	0.191
Engineers subjected to verbal flirting and harassment at work.	40.00	5	40.00	4	40.00	2	40.00	4	1.000
<b>All factors</b>	55.24		55.00		40.00		63.33		0.309

Table (4.59) indicated that "Customs and tradition play a major role in the decision to specialize in engineering" was ranked in first position in overall sample, Employment engineering women, and in female students with RII (71.43), RII (70.00) and RII (100.00) and ranked in third position for Unemployment engineering women with RII (20.00). This factor discussed in page 72.

"Women in the workplace are respected as a man" was ranked in second position in overall sample, Employment , and in Unemployment engineering women with RII (60.00), RII (65.00) and RII (40.00) and ranked in third position in female students industry engineering women with RII (60.00).This factor discussed in page 72.

"Provide grants and university loans impact on my choice of Engineering" was ranked in second position in overall sample, Employment , and in Unemployment engineering women with RII (60.00), RII (65.00) and RII (40.00) and ranked in third position in female students with RII (60.00).This factor discussed in page 72.

"Engineers subjected to verbal flirting and harassment at work" was ranked last position in overall sample, Employment engineering women, and in female students with RII (40.00), RII (40.00) and RII (40.00) and ranked in second position in Unemployment engineering women with RII (40.00). In my opinion, Women are

subjected to sex discrimination and harassment while entering to male-dominated work fields such as industry. Discrimination against Female Engineers Attitudes prevalent in the industry towards women led to the following: Few women were usually recruited as employers thought that the management of their homes would prevent their effective performance on the job, and discrimination on promotion, so this result one of the influences for not choosing a career in engineering industry. This result agreed with Perreault (1992) when found and discuss that women must learn how to effectively address and cope with aggression, foul language, sexual harassment, intimidation and rejection in the construction industry. Furthermore, research shows that women are faced with sexual harassment at many construction sites and this does not contribute to their health and safety on sites. In South Africa study found that 7.7% that discrimination was one of the influences for not choosing a career with a further 3.3% reporting sexual harassment by males as an influence.

#### 4.3.9.6 Hypotheses number six tested in this research are

9. *Null hypothesis (Ho)*: The cultural upbringing of women influences their choice of careers in the engineering disciplines. (at .05 levels).
10. *Alternative hypothesis (H1)*: The cultural upbringing of women doesn't influence their choice of careers in the engineering disciplines. (at .05 levels).

Table (4.60) indicated that P-value (0.873) > 0.05 for overall sample as whole, null hypothesis is rejected.

**Table (4.66) Culture of overall sample of all discipline of engineering women Employment in the field of engineering**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Women in the workplace are respected as a man.	68.69	1	70.91	1	65.26	2	64.78	2	0.175
Customs and tradition play a major role in the decision to specialize in engineering.	66.63	2	67.82	2	64.21	3	64.78	2	0.640
The man can do everything as well as for women.	64.57	3	64.36	3	72.63	1	61.74	3	0.151
Engineers subjected to verbal flirting and harassment at work.	60.11	4	58.36	4	56.84	4	65.65	1	0.116
Employment women in the field of engineering does not have the opportunity to develop the same as her male colleagues.	52.34	5	53.27	5	54.74	5	49.13	5	0.553
Provide grants and university loans impact on my choice of Engineering.	46.06	6	45.27	6	41.05	6	50.00	4	0.155
<b>All factors</b>	59.73		60.00		59.12		59.35		0.873

### 4.3.9.7 Comparison for each discipline

Table (4.61) Comparison for each discipline related to the group number nine "Culture"

Ranked	Civil	RII	Architecture	RII	Communication	RII	Computer	RII	Industry	RII
1	Women in the workplace are respected as a man.	70.26	Women in the workplace are respected as a man.	71.43	Women in the workplace are respected as a man.	71.72	The women can do everything as well as for men.	66.46	Customs and tradition play a major role in the decision to specialize in engineering.	71.43
2	Customs and tradition play a major role in the decision to specialize in engineering.	69.74	The man can do everything as well as for women.	65.14	Customs and tradition play a major role in the decision to specialize in engineering.	66.90	Women in the workplace are respected as a man.	65.85	Women in the workplace are respected as a man.	60.00
3	The women can do everything as well as for men.	68.21	Customs and tradition play a major role in the decision to specialize in engineering.	64.57	Engineers subjected to verbal flirting and harassment at work.	58.62	Customs and tradition play a major role in the decision to specialize in engineering.	65.23	Provide grants and university loans impact on my choice of Engineering.	60.00
4	Engineers subjected to verbal flirting and harassment at work.	62.05	Engineers subjected to verbal flirting and harassment at work.	58.29	Employment women in the field of engineering does not have the opportunity to develop the same as her male colleagues.	57.93	Engineers subjected to verbal flirting and harassment at work.	62.77	The man can do everything as well as for women.	51.43
5	Employment women in the field of engineering does not have the opportunity to develop the same as her male colleagues.	45.13	Employment women in the field of engineering does not have the opportunity to develop the same as her male colleagues.	54.29	The man can do everything as well as for women.	57.93	Employment women in the field of engineering does not have the opportunity to develop the same as her male colleagues.	53.54	Employment women in the field of engineering does not have the opportunity to develop the same as her male colleagues.	48.57
6	Provide grants and university loans impact on my choice of Engineering.	43.59	Provide grants and university loans impact on my choice of Engineering.	40.57	Provide grants and university loans impact on my choice of Engineering.	44.83	Provide grants and university loans impact on my choice of Engineering.	49.54	Engineers subjected to verbal flirting and harassment at work.	40.00

Table (4.61) indicated that *"Women in the workplace are respected as a man"* was ranked in first position for civil, Architecture and communication engineering women and ranked in second position for computer and industry engineering discipline. The ranking between engineering disciplines are much closed and confined on respected of women in workplace and the characteristic of engineering women. But this result disagreed with Madikizela (2008) study in South Africa where the survey it is evident that women are still not respected on construction sites because their ability to work in construction is underestimated in the industry.

*"Customs and tradition play a major role in the decision to specialize in engineering"* was ranked in second position for civil, communication engineering women also ranked in third position for architect and computer engineering women and ranked in first position for industry engineering women. From this ranked notes the importance and the effect custom and tradition on industry engineering women when choosing their career in engineering. In general customs and tradition has major influence on women when choosing her career in different engineering discipline. This result agreed with Taylor(2010) result that culture has a major influence on why women have chosen or been restricted from choosing different discipline of engineering.

*"The women can do everything as well as for men"* was ranked in third position for civil and industry engineering women also ranked in second position for architect engineering women, also ranked in position number four for communication engineer and ranked in first position for computer engineering women. From this result notes that women can do everything ranked in first position for computer engineering women this return to nature of task and job of computer engineering women that's task don't need to physical capability it depend on mental effort but for communication engineer ranked in position number four since communication engineer Employment in electrical job or netEmployment engineer so that job need a lot of movement and work in site rather than office so that factor has ranked in late position. But this result disagreed with Matope (2007), (Clarke et al., 2005) and (Aulin and Jingmond, 2011).

*"Engineers subjected to verbal flirting and harassment at work"* was ranked in position number four for civil, Architecture and communication engineering women also ranked in third position for communication engineer and ranked in position number five for industry engineering women.

*"Employment women in the field of engineering does not have the opportunity to develop the same as her male colleagues"* was ranked in position number five for civil, Architecture and computer engineering women, and ranked in position number four for communication and industry engineering women.

*"Provide grants and university loans impact on my choice of Engineering"* was ranked in last position for civil, Architecture, communication and computer and ranked in second position for industry engineering women.



### 4.3.10 Group number ten

#### 4.3.10.1 Discipline: Civil engineering women

Table (4.62) show the relative importance indices and ranks of factors of the group number ten this group contains 4 factors.

**Table (4.62) Rank and RII of Group number ten "Civil engineer"**

Statement	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Increase the number of women in engineering contributes in improving the performance of work.	69.23	1	66.00	2	76.00	1	85.00	1	0.083
Low number of women in engineering contributes to the shortage of skills in the profession.	67.69	2	65.33	3	76.00	1	75.00	2	0.386
Religiosity women play a key role in the decision-making for women's Employment .	67.18	3	70.67	1	52.00	2	60.00	3	0.191
I studied engineering in order to work in the field of family business.	42.05	4	40.00	4	48.00	3	50.00	4	0.508
<b>All factors</b>	61.54		60.50		63.00		67.50		0.595

Table (4.62) "*Increase the number of women in engineering contributes in improving the performance of work*" was ranked in first position in overall sample, Unemployment engineering women and female students with RII (69.23), RII (76.00) and RII (85.00) and ranked in second position in Employment engineering women with RII (66.00). This result agreed with South Africa study done by Madikizela (2008) The study found that the low employment of women in construction contributed to the skills shortage in the construction industry and that an increased number of women in construction would contribute to the improvement of skills shortages in the construction industry.

"*Low number of women in engineering contributes to the shortage of skills in the profession*" was ranked in second position in overall sample and female students with RII (67.69) and RII (75.00), ranked in first position in Unemployment engineering women with RII (76.00) and ranked third position in Employment engineering women with RII (65.33). This result agreed with South Africa study done by Madikizela (2008) The study found that the low employment of women in construction contributed to the skills shortage in the construction industry and that an increased number of women in construction would contribute to the improvement of skills shortages in the construction industry.

"*I studied engineering in order to work in the field of family business*" was ranked last position in all civil engineering women overall sample, Employment and Unemployment engineering women and in female student's sample. This result agreed with Arslan & Kivrak (2004).

#### 4.3.10.2 Discipline: Architecture engineering women

Table (4.63) Rank and RII of Group number ten "Architecture engineer"

Statement	Over all sample		Employment engineering women		Unemployment Engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Increase the number of women in engineering contributes in improving the performance of work.	68.57	1	70.40	1	64.00	1	64.00	1	0.617
Religiosity women play a key role in the decision-making for women's Employment .	64.00	2	66.40	2	60.00	2	56.00	2	0.516
Low number of women in engineering contributes to the shortage of skills in the profession.	54.86	3	56.80	3	44.00	4	56.00	2	0.442
I studied engineering in order to work in the field of family business.	45.71	4	44.00	4	56.00	3	44.00	3	0.466
<b>All factors</b>	58.29		59.40		56.00		55.00		0.670

From table (4.63) "Increase the number of women in engineering contributes in improving the performance of work" was ranked in first position in overall samples, Employment, Unemployment engineering women and in female students with RII (68.57), RII (70.40), RII (64.00) and RII (64.00). This factor discussed in page 79.

"Religiosity women play a key role in the decision-making" was ranked in second position in overall samples, Employment, Unemployment and in female students of Architecture engineering women with RII (64.00), RII (66.40), RII (60.00) and RII (56.00). In fact religiosity controls our action in all life work in filed or in other things. This is result mean the importance of religiosity in our community. Jayne et al., (1999) agreed with this result women who seek entry into male-dominated cultures either have to act like men in order to be successful, or leave if they are not adaptable to the culture, or they can remain in the industry without behaving like men but maintaining unimportant positions. So, women Employment in this industry are faced up to several difficulties within this culture.

"I studied engineering in order to work in the field of family business" was ranked last position for all Architecture engineering women overall sample, Employment, Unemployment engineering women and female students sample. This result agreed with Arslan &Kivrak(2004).

#### 4.3.10.3 Discipline: Communication engineering women

Table (4.64) indicated that "Increase the number of women in engineering contributes in improving the performance of work" was ranked in first position in overall sample, Employment and Unemployment engineering women with RII (68.23), RII (70.00) and RII (65.00) and ranked in second position in female students with RII (66.67). From factor analysis was canceled. This factor discussed in page 79.

"Low number of women in engineering contributes to the shortage of skills in the profession" was ranked in second position in overall sample, Employment and Unemployment engineering women with RII (62.23), RII (61.00) and RII (60.00) and ranked in first position in female students with RII (73.67). This factor discussed in page 79.

"I studied engineering in order to work in the field of family business" was ranked last position for all communication engineering women overall sample, Employment, Unemployment engineering women and female student's sample. This result agreed with Arslan &Kivrak(2004). This factor discussed in page 79.

**Table (4.64) Rank and RII of Group number ten "Communication engineer"**

Number	Statement	Over all sample		Employment engineering women		Unemployment Engineering women		Female students		F-test	P-Value
		RII	Rank	RII	Rank	RII	Rank	RII	Rank		
١	Increase the number of women in engineering contributes in improving the performance of work.	68.97	1	70.00	1	65.00	1	66.67	2	0.257	0.775
1	Low number of women in engineering contributes to the shortage of skills in the profession.	62.76	2	61.82	2	60.00	2	73.33	1	0.865	0.433
٢	Religiosity women play a key role in the decision-making for women's Employment .	61.38	3	61.82	2	60.00	2	60.00	3	0.022	0.978
٤	I studied engineering in order to work in the field of family business.	47.59	4	48.18	3	45.00	3	46.67	4	0.045	0.956
	<b>All factors</b>	60.17		60.45		57.50		61.67		0.193	0.825

#### 4.3.10.4 Discipline: Computer engineering women

**Table (4.65) Rank and RII of Group number ten "Computer engineer"**

Statement	Over all sample		Employment engineering women		Unemployment Engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Increase the number of women in engineering contributes in improving the performance of work.	64.00	1	65.52	1	45.00	3	65.00	1	0.156
Low number of women in engineering contributes to the shortage of skills in the profession.	62.46	2	60.69	3	60.00	1	64.38	2	0.769
Religiosity women play a key role in the decision-making for women's Employment .	59.08	3	64.14	2	50.00	2	55.63	3	0.205
I studied engineering in order to work in the field of family business.	47.08	4	47.59	4	50.00	2	46.25	4	0.911
<b>All factors</b>	58.15		59.48		51.25		57.81		0.567

Table (4.65) indicated that "Increase the number of women in engineering contributes in improving the performance of work" was ranked in first position in overall sample, Employment engineering women and in female students with RII (64.23), RII (65.00)

and RII (65.00) and ranked in third position in Unemployment engineering women with RII (45.67). This factor discussed in page 79.

"Low number of women in engineering contributes to the shortage of skills in the profession" was ranked in second position in overall sample and female students with RII (62.23) and RII (64.00) and ranked in first position in Employment engineering women with RII (60.67) and ranked in third position for Unemployment engineering women with RII (60.69). This factor discussed in page 79.

"I studied engineering in order to work in the field of family business" was ranked last position for all computers engineering women overall sample, Employment, and Unemployment engineering women and in female students. This result agreed with Arslan &Kivrak(2004).

#### 4.3.10.5 Discipline: Industry engineering women

Table (4.66) Rank and RII of Group number ten "Industry engineer"

Statement	Over all sample		Employment engineering women		Unemployment Engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Increase the number of women in engineering	71.43	1	75.00	1	40.00	1	80.00	1	0.041
Religiosity women play a key role in the	68.57	2	75.00	1	20.00	2	80.00	1	0.009
Low number of women in engineering	60.00	3	60.00	2	20.00	2	80.00	1	0.250
I studied engineering in order to work in the	34.29	4	30.00	3	40.00	1	40.00	2	0.490
<b>All factors</b>	58.57		60.00		30.00		70.00		0.035

Table (4.66) indicated that "Increase the number of women in engineering contributes in improving the performance of work" was ranked in first position in overall sample, Employment, Unemployment engineering women and female students with RII (71.43), RII (75.00), RII (40.00) and RII (80.00). P-value of this factor is 0.041 less than 0.05 so there is difference in opinion between all categories of industry engineering women. This factor discuss above.

"Religiosity women play a key role in the decision-making" was ranked in second position in overall samples and Unemployment engineering women with RII (68.57) and RII (20.00) and ranked in first position in Employment engineering women and female students with RII (75.00) and RII (80.00).. In fact religiosity controls our action in all life work in filed or in other things. This is result mean the importance of religiosity in our community. Jayne et al., (1999) agreed with this result women who seek entry into male-dominated cultures either have to act like men in order to be successful, or leave if they are not adaptable to the culture, or they can remain in the industry without behaving like men but maintaining unimportant positions. So, women Employment in this industry are faced up to several difficulties within this culture.

"I studied engineering in order to work in the field of family business" was ranked last position for all industry engineering women overall sample, Employment, and Unemployment engineering women and female students. This result agreed with Arslan &Kivrak(2004).

### 4.3.10.6 Comparison for each discipline

**Table (4.67) Comparison for each discipline related to the group number ten**

Ranked	Civil	RII	Architecture	RII	Communication	RII	Computer	RII	Industry	RII
1	Increase the number of women in engineering contributes in improving the performance of work.	69.23	Increase the number of women in engineering contributes in improving the performance of work.	68.57	Increase the number of women in engineering contributes in improving the performance of work.	68.97	Increase the number of women in engineering contributes in improving the performance of work.	64.00	Increase the number of women in engineering contributes in improving the performance of work.	71.43
2	Low number of women in engineering contributes to the shortage of skills in the profession.	67.69	Religiosity women play a key role in the decision-making for women's Employment .	64.00	Low number of women in engineering contributes to the shortage of skills in the profession.	62.76	Low number of women in engineering contributes to the shortage of skills in the profession.	62.46	Religiosity women play a key role in the decision-making for women's Employment .	68.57
3	Religiosity women play a key role in the decision-making for women's Employment .	67.18	Low number of women in engineering contributes to the shortage of skills in the profession.	54.86	Religiosity women play a key role in the decision-making for women's Employment .	61.38	Religiosity women play a key role in the decision-making for women's Employment .	59.08	Low number of women in engineering contributes to the shortage of skills in the profession.	60.00
4	I studied engineering in order to work in the field of family business.	42.05	I studied engineering in order to work in the field of family business.	45.71	I studied engineering in order to work in the field of family business.	47.59	I studied engineering in order to work in the field of family business.	47.08	I studied engineering in order to work in the field of family business.	34.29

Table (4.67) indicated that "Increase the number of women in engineering contributes in improving the performance of work" was ranked in first position for civil, Architecture, communication, computer and industry engineering discipline. This compatibility between the views of engineering women on this factor confirms the importance of the presence of women in the workplace, where they lead to improved work and increase efficiency.

"Low number of women in engineering contributes to the shortage of skills in the profession" was ranked in second position for civil, communication and computer engineer and ranked in third position for architect and industry. This ranking is much closed for other and this confined the above factor that increase the number of women in engineering contributes in improving the performance of work.

"Religiosity women play a key role in the decision-making for women's Employment" was ranked in third position for civil, communication and computer engineer and ranked in second position for architect and industry. This result confined the important of religiosity for architect and industry engineering women rather than civil, communication and computer engineering women.

"I studied engineering in order to work in the field of family business" was ranked in last position for civil, Architecture, communication, computer and industry engineering discipline. This indicted that the low effect this factor on women when choosing her career.

#### 4.3.11 Ranking of factor group are affecting women career choice of engineering discipline

Table (4.68) indicated that "The personal qualities of an engineer engineering women" was the most factor effect women when she choice her career in engineer, then "Discrimination against Women", in other hand "Family and parents" was the least factor effect women when choice her career in engineer.

**Table (4.68) Ranking of factors groups are affecting women career choice of engineering discipline.**

Fields	Over all sample		Employment engineering women		Unemployment engineering women		Female students		P-Value
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
The personal qualities of an engineer engineering women	76.73	1	82.14	1	77.14	1	65.71	5	0.027
Discrimination against Women	68.89	2	68.89	2	64.44	2	71.11	2	0.899
Male dominance on the engineering profession	65.71	3	61.36	4	43.64	5	85.45	1	0.015
Work environment and working hours	65.40	4	65.00	3	64.44	2	66.67	4	0.944
Social value and prestige related with engineer	63.81	5	68.89	2	51.11	4	60.00	8	0.036
Group number ten	58.57	6	60.00	5	30.00	8	70.00	3	0.035
Culture	55.24	7	55.00	6	40.00	6	63.33	7	0.309
The ability of women to work in the field of engineering	51.19	8	47.08	9	40.00	6	65.00	6	0.349
Historical role of women	49.05	9	52.50	7	33.33	7	50.00	9	0.082
Family and parents	46.03	10	50.56	8	62.22	3	28.89	10	0.005
<b>All factors</b>	<b>60.14</b>		<b>60.73</b>		<b>51.71</b>		<b>63.17</b>		<b>0.168</b>

## **Part three: Attitude of engineering women concerning developing their future career.**

#### 4.4 Part three: Attitude of engineering women concerning developing their future career.

This part will cover the second, third and last objectives of this research. This objective is:

1. Attitude of engineering women concerning developing their future career. And barriers to women entering and Employment within different engineering discipline.
2. Determine the popularity of some engineering disciplines as career for women.
3. Investigate the relationship between culture background and the effect perceived image of the engineering disciplines on recruiting the women.

##### 4.4.1 Attitude of engineering women concerning developing their future career.

Table (4.69) Show that factor influenced on women decision when choice her career in engineering ranking from highest to lowest according to percent agreement of the sample as follows:

**Table (4.69) Attitude of engineering women concerning developing their future career**

Influence	high%	medium%	low%	Percent %
High rate in high school.	68.0	24.6	7.4	86.86
Exploration of the unknown.	54.9	36.0	9.1	81.90
High social value of engineer.	54.3	34.3	11.4	80.95
Interest in mathematics and physics	48.0	38.9	13.1	78.29
Career expectations.	49.1	34.9	16.0	77.71
Engineering prestige.	45.7	35.4	18.9	75.62
Convinced by your parents.	40.0	38.3	21.7	72.76
Knowledge.	32.6	52.6	14.9	72.57
Challenging work environment.	36.0	39.4	24.6	70.48
Financial prospects.	32.6	38.9	28.6	68.00
Cultural Background.	18.3	57.1	24.6	64.57
Encouraged by the knowledge of women who have had successful careers in engineering profession.	26.3	25.7	48.0	59.43
Male dominance of engineering profession.	15.4	38.3	46.3	56.38
Difficult study of engineering college.	10.3	45.1	44.6	55.24
High cost of engineering study.	12.0	34.3	53.7	52.76

Table (4.69) indicated that "*High rate in high school*" topped in the first place and received the highest degree of approval with agreement percent 86.86%. From my point of view this result agreed with the actual of our society that most female students male or female choose



their career depend on their average in high school. This is the most important factor that leads me to study engineering discipline.

*"Exploration of the unknown"* ranked in second position from the most important factor effect women when choice her career with agreement percent 81.9%, this result agreed with Madikizela (2008) where in his study (52.9%) cited the exploration of the unknown is a major influence in their decision.

*"High social value of engineer"* ranked in third position from the most important factor effect women when choice their career with agreement percent 80.95%. This result agreed with Cutler et al. (2006), Singaravelu et al. (2005) and Wilkinson (1996) when they found that personal factors such as prestige, personality type and lifestyle preference played an important role in future career choices.

*"Interest in mathematics and physics"* ranked in position number four from the most important factor effect women when choice their career with agreement percent 78.29%. This result agreed with Fleming et al. (2005) in his study conclude that the female students choose studying an engineering effected by many factors, the result is Seventy-five per cent of participants indicated that the enjoyment of mathematics and science and financial concerns were primary motivational factors in their pursuit of an engineering education

*"Career expectations"* ranked in position number five from the most important factor effect women when choice their career with agreement percent 77.71%. 77.7 from participant agreed career expectations lead them to study engineering but when women Unemployment from engineering faculty and search to job they shock with real life and limited job opportunities provide in our society. In 2012, In the Gaza Strip Bulletin Engineers Association disclaimer to high school female students to think carefully before studying engineering for lack of employment opportunities, and increase the number of engineers don't work in the Gaza Strip and in the same disclaimer has published the number of engineers who are Employment and the number of engineers don't work, in a reference to the importance of finding jobs after studying. This indicated the importance of this factor "job opportunities and societal need" on choosing the career.

*"Engineering prestige"* ranked in position number six from the most important factor effect women when choice their career with agreement percent 75.62%. This result agreed with Cutler et al. (2006), Singaravelu et al. (2005) and Wilkinson (1996) when they found that personal factors such as prestige, personality type and lifestyle preference played an important role in future career choices.

*"Convinced by your parents"* ranked in position number seven from the most important factor effect women when choice their career with agreement percent 72.76%. This result agreed with Borchert(2002), kassim et.al(2011), badolato(1998), Georgiou(1999), furlong (1986), and fielden et.al (2000).

*"Knowledge"* ranked in position number eight from the most important factor effect women when choice their career with agreement percent 72.57%. This agreed with Fielden et al. (2000), Madikizela (2008) also with result of Layne (2009) study the biggest problem limiting the enrollment of women in engineering is the general public lack of knowledge about engineering; also he cited that the American women's movement focused on the

sciences rather than on engineering because the latter lacked cultural authority. This result mean there is general lack of knowledge about engineering career and it opportunities so that result agreed with the result of South Africa that found there was a general lack of knowledge of the industry itself as well as career opportunities that the industry offered.

*"Challenging work environment "*ranked in position number nine from the most important factor effect women when choice their career with agreement percent 70.48%. This result agreed with Chileshe and Haupt (2010) found safety and health problems in construction create barriers to women entering and remaining in this field. And agreed with Warren (2003) found women choose a career in the construction industry if the work environment provides good Employment conditions

*"Financial prospects"* ranked in position number ten from the most important factor effect women when choice her career with agreement percent 68.00%. This result agreed with Kumbhar (2011), Geertsema (2007) they found in construction sector, females are paid less than male.

*"Cultural Background"* ranked in position number eleven from the most important factor effect women when choice her career with agreement percent 64.57%. This result agreed with Taylor(2010) found Culture has a major influence on why women have chosen or been restricted from choosing different discipline of engineering. And this result agreed with Hill (2010), (Frehill et al., 2009). Fearfull and Kamenou (2006), Ferguson and Sharples (1994), Greed (2000), Jayne et al. (1999), Fielden et al. (2000) Gale (1994).

*"Encouraged by the knowledge of women who have had successful careers in engineering profession"* ranked in position number twelve from the most important factor effect women when choice their career with agreement percent 59.43%. The percentage of women employed in the construction industry globally is less than 10%. The percentage of women that are Employment registered or act as role models and leaders by managing their own construction firms is even less (Geerstemar, 2005).

*"Male dominance of engineering profession"* ranked in position number thirteenth from the most important factor effect women when choice her career with agreement percent 56.38%. This study found that the expectations and perceptions of Employment women of a male dominated discriminatory industry prior to entering were the same as those held by female students. The study further found that women held more strongly that the industry was discriminatory than men. These findings suggest that the construction industry continues to be male dominated and discriminatory against women This result agreed with Gale (1994), Agapiou (2002), fielden et.al (2000) found male dominance lead women to choose other sector than engineering.

*"Difficult study of engineering college"* ranked in position number fourteenth from the most important factor effect women when choice her career with agreement percent 55.24%. This factor has effect women when choosing engineering career.

*"High cost of engineering study"* ranked in position number fifteenth." last position" from the most important factor effect women when choice her career with agreement percent 52.76%. This factor has least effect women when choosing engineering career.

#### 4.4.2 Barriers to women entering and Employment within different engineering disciplines.

Table (4.70) indicated that the most reasons pouch engineering women to choice other sectors than engineer ranking from highest to lowest according to percent of agreement of the sample as follows:

Table (4.70) suggested that "*The discriminatory environment of engineering profession*" the effect this reason on respondent 56.0% has high effect, 31.4% medium effect and 12.6 % low effect with percent 81.14%. So it was the most factor influence on women to choose her career in other sector than engineer. Women are subjected to sex discrimination while entering to male-dominated work fields such as the construction industry. Discrimination against Female Engineers Attitudes prevalent in the construction industry towards women led to the following: Few women were usually recruited as employers thought that the management of their homes would prevent their effective performance on the job, and discrimination on promotion. This result agreed with Lauer (2010) who stated that discrimination reflect negative image when women choice her career.

"*Male dominance of engineering profession*" the effect this reason on respondent 42.9% has high effect, 44.6% medium effect and 12.6 % low effect with percent 76.76%. This result agreed with Gale (1994), Agapiou (2002), fielden et. al (2000) they stated that male dominance on some engineering disciplines prevents women from choosing engineering.

"*Financial prospects*" the effect this reason on respondent 37.1% has high affect, 42.3% medium effect and 20.6 % low effect with percent 72.19%. This result agreed with Kumbhar (2011), Geertsema (2007) they stated that in construction sector, females are paid less than male. And this result agreed with Fielden et al. (2000) who stated that top positions are male dominated in this industry; women could not get enough support in this subject. This may cause to an obstacle for promotion in their processional career.

"*Career expectations*" the effect this reason on respondent 36.6% has high affect, 42.3% medium effect and 21.1 % low effect with percent 71.81%. This result agreed with Fielden et al. (2000) who stated that top positions are male dominated in this industry; women could not get enough support in this subject. This may cause to an obstacle for promotion in their processional career.

"*Knowledge of the engineering profession*" the effect this reason on respondent 28.8% has high affect, 54.3% medium effect and 17.1 % low effect with percent 70.48%. This result in line with Fielden et al. (2000) who stated that a general lack of knowledge and information about the industry, the career opportunities available, and what qualifications are required. Also societal factors are also affecting the construction industry's ability to hire women.

"*The masculine and unattractive image of engineering profession*" the effect this factor on respondent 34.3% has high affect, 42.3% medium effect and 23.4 % low effect with percent 70.29%.this result in line with (Sommerville et al. 1993, Dainty et al. 2000, Fielden et al. 2000, Agapiou 2002) they stated that construction is well known as a

male-dominated industry with a strong masculine culture. And also stated that first factor to consider in understanding the shortage of workers is the construction industry's problem with 'image', which makes both men and women reluctant or uninterested in the industry.

**Table (70) Barriers to women entering and Employment within different engineering discipline.**

Influence	low%	medium	high%	Percent %
The discriminatory environment of engineering profession.	12.6	31.4	56.0	81.14
Male dominance of engineering profession.	12.6	44.6	42.9	76.76
Financial prospects.	20.6	42.3	37.1	72.19
Career expectations.	21.1	42.3	36.6	71.81
Knowledge of the engineering profession	17.1	54.3	28.8	70.48
The masculine and unattractive image of engineering profession	23.4	42.3	34.3	70.29

#### 4.4.3 Popularity of engineering disciplines

Table (4.71) suggested that 51.9% from samples think that Architecture engineering discipline is the most attractive engineering discipline for women. 31.4% from samples think that computer engineering discipline is the most attractive engineering discipline for women. 11.4% from samples think that civil engineering discipline is the most attractive engineering discipline for women, 4.6% from samples think that communication engineering discipline is the most attractive engineering discipline for women, and 1.1% from samples think that industry engineering discipline is the most attractive engineering discipline for women.

Actually, some task in engineering is not suited to engineering women in all discipline any way in other hand many task are suited for women rather than man like brain storm, design, management task and others. This result agreed with Matope (2007), Aulin and Jingmond (2011) and Clarke et al. (2005) when they found that most women seem to agreed that they can cope with the physical part of the job, while many claimed that they need to be psychologically strong to be on a building site. The women on site feel that they need to be as good as the men. They also need to fit into the accepted behavior of the workplace which can even mean comprising their 'female' identity.

**Table (4.71) Popularity of engineering disciplines**

	Civil	Architecture	Communication	Computer	Industry	Total
<b>Frequency</b>	20	90	8	55	2	175
<b>Percentages</b>	11.4	51.4	4.6	31.4	1.1	100

#### 4.4.4 The relationship between culture background and the effect perceived image of the engineering disciplines on recruiting the women.

Table (4.72) suggested that more than half (54.9%) of the respondent reported that cultural beliefs would influence their success in engineering careers. However a higher percentage (72.0%) reported that the cultural differences between males and females had influenced their career choices. (61.5%) of these respondents reported that this influence contributed to the low representation of women in construction. A further 51.6% reported that this influence ultimately contributed to the prevalence of discrimination against women who had entered engineering discipline. This finding suggested that there is a relationship between the women's choice of careers in engineering and their cultural beliefs as these were informed in their upbringing and determined by their historical backgrounds. Culture has a major influence on why women have chosen or been restricted from choosing different discipline of engineering. So women who seek entry into male-dominated cultures either have to act like men in order to be successful, or leave if they are not adaptable to the culture, or they can remain in the industry without behaving like men but maintaining unimportant positions. Women Employment in some engineering discipline are faced up to several difficulties within male culture and women consider themselves very much in a minority. This result was in line with South Africa study done by Madikizela (2008), Fielden et al. (2000), Greed (2000), (Jayne et al., 1999) and Gale (1994).

**Table (4.72) the members of the sample agreed that there is relationship between culture and choices of profession and career success**

Question	Yes%	Unsure%	No%
Do you think that your Customs and traditions affect the success of your career in your field of engineering?	54.9	18.9	26.3
Do you think that the cultural difference between males and females affect the choice of the engineering profession?	72.0	2.9	25.1
If the answer is <u>yes</u> , do you think that this effect contributes to the low presence of women in engineering?	61.5	6.9	31.5
If the answer is <u>yes</u> , do you think that this contributes to the spread of discrimination against Women, which entered in the field of engineering?	51.6	14.1	34.4

#### 4.4.4 Opinion of engineering women with engineering discipline

Table (4.73) indicated that 64% of respondent think that their choice career in engineering is right decision this mean that high rate of engineering women happy with their choice career in engineering, but 36% think they have wrong choice career in engineering also high, may be that refer to rare of Employment chance in engineering in our country. 61.1% of respondent choice their career based on the desire to advance, 68.6% of respondent agreed that university degree in engineering qualifies (technically - psychologically - socially) to enter the field of work that mean women have confidence to enter Employment engineering filed and compete to occupy on first position. 75.5% of Employment women satisfaction about their work, 60.9% of Employment women agreed that Employment in engineer meet their goals, 42.3% of respondent will encourage junior engineers to enter in the field of engineering and this is less than half, 15.4% of respondent agreed that small number of

women employees in some engineering disciplines due to the inefficiency and lack of skill that mean women have good skills in engineering work and can be creative if take chance to work without discrimination. 22.2% think that the low number of women to choose jobs in engineering contributes to this, 66.3% of respondent think that jobs in the field of engineering are less popular for women to specialize in other sectors, 3.7% will study another sector as mathematics or physics if they don't have an opportunity to work as engineer this refer the desire of women to have chance to work and from her invite all said to take their responsibility to solve unemployment problem to enable engineering women to have chance to work in the field of engineer. 15.4% of respondent have knowledge about engineering before choice their career and they obtain this knowledge from Internet 17.7%, school 14.9%, family 33.7% and 33.7% from other source this result disagreed with South Africa study done by Madikizela (2008) where his result only a minority (16.3%) of respondents reported gaining their knowledge through their involvement in construction while 22.1% reported gaining the information via the internet, 14% received their knowledge from their education and the remaining 14% acquired this information from their families.

**Table (4.73) Opinion of engineering women with engineering discipline**

Statement	Yes%	No%	Unsure%	
Do you think that your choice of career was a right decision?	64.00	20.6	15.4	
Do you choosing field of engineering based on the desire to advance?	61.1	38.3	0.6	
Do you feel that a university degree in engineering qualifies (technically - psychologically - socially) to enter the field of work?	68.6	23.4	8.0	
If you work; do you satisfaction about your work in engineering?	75.5	15.5	9.1	
In your work as an engineer you meet your goals with business goals?	60.9	32.7	6.4	
I will encourage junior engineers to enter in the field of engineering?	42.3	40.6	17.1	
Small number of women employees in some engineering disciplines due to the inefficiency and lack of skill.	15.4	69.7	14.9	
If the answer is yes, do you think that the low number of women to choose jobs in engineering contributes to this?	22.2	66.7	11.1	
Do you think that jobs in the field of engineering are less popular for women to specialize in other sectors?	66.3	12.6	21.1	
If I don't get an opportunity to work as engineer I will study another field a mathematics or physics?	13.7	66.3	20.00	
my knowledge of the engineering profession before choice engineering profession	15.4	50.9	33.7	
	Internet	school	Family	Other
How did you acquire this knowledge	17.7%	14.9%	33.7%	33.7%

## **Part four: Company attitude with engineering women**

#### 4.5 Part four: Company attitude with engineering women

This part will cover questioner distributed to company that Employment in different engineering discipline and their perception of work of engineering women in their company.

**Table (74) Company attitude with engineering women**

	Frequency	Percentages
<b>1. Company field</b>		
Contracting	15	30
Consulting engineering	11	22
Internet & communications	11	22
Designing	4	8
Electricity	9	18
<b>Total</b>	<b>50</b>	<b>100</b>
<b>2. Number of employees in the company</b>		
Less than 10 employees	18	36
(11-20) employees	12	24
(21-30) employees	1	2
More than 30 employees	19	38
<b>Total</b>	<b>50</b>	<b>100</b>
<b>3. Number of women employees in the company</b>		
Less than 5	28	56
(6-10)	5	10
(11-15)	5	10
More than 15	12	24
<b>Total</b>	<b>50</b>	<b>100.00</b>
<b>4. Are employed engineer actually works in the field of engineering?</b>		
Yes	6	16
No	40	80
Unsure	2	4
<b>Total</b>	<b>50</b>	<b>100.0</b>
<b>5. Engineering women have a chance to get a job equal to men engineer in the office work</b>		
Yes	33	66
No	15	30
Unsure	2	4
<b>Total</b>	<b>50</b>	<b>100.00</b>
<b>6. Engineering women have a chance to get a job equal to men engineer in the site work</b>		
Yes	24	48
No	26	52
Unsure	0	0
<b>Total</b>	<b>50</b>	<b>100</b>
<b>7. Company provide separate facilities for women employees</b>		
Yes	11	22
No	39	78
Unsure	0	0
<b>Total</b>	<b>50</b>	<b>100</b>
<b>8. Companies have clear and explicit policy in the non-discrimination when hiring, training and gathering information on the basis of sex.</b>		
Yes	24	48
No	13	26
Unsure	13	26
<b>Total</b>	<b>50</b>	<b>100</b>
<b>9. Is your company gives women a chance to get promoted within the structure of the company</b>		
Yes	48	96
No	2	4
Unsure	0	0
<b>Total</b>	<b>50</b>	<b>100</b>
<b>10. Do you are work to get finance support in order to improve the status and skills of women Employment for you?</b>		
Yes	47	94
No	1	2



**Table (74) Company attitude with engineering women**

	Frequency	Percentages
Unsure	2	4
<b>Total</b>	<b>50</b>	<b>100</b>

Table (4.74) indicated that 52% of company fields is consulting and contracting, 36% of respondent have less than 10 employee, 56% have less than 5 women employee, 80% of women Employment in companies don't work in engineering fields, 66% of companies give women equal chance as men in work office, 48% give women same chance as men in task work in site, 22% provide separate facilities to women, 48% of companies have clear and explicit policy in the non-discrimination when hiring, training and gathering information on the basis of sex, 96% of companies give women a chance to get promoted within the structure of the company and 94% of companies get finance support in order to improve the status and skills of women Employment this result disagreed with Madikizela (2008).

From the survey it is evident that women are still not respected on some engineering work because their ability to work in engineering is underestimated. The findings also suggest that while organizations claim that their female workers are entitled to the same opportunities as their male colleagues, and their claim they are providing finances targeted at improving the status and qualification of women.

Discrimination in recruitment, remuneration, inflexible Employment conditions, as well as insufficient services such as child care continues to restrict employment and advancement opportunities for women. Negative attitudes also stand in the way of women's advancement. Discrimination manifests itself differently across the spectrum of organizational practices. Very often, gender discrimination can be very hard to pick out. This is because it is very subtle, it is based on beliefs and practices that have been there for centuries and regarded as normal.

## Part five: Factor analysis

## 4.6 Part five: Factor analysis

This part will present the factor analysis and comparison between the result of factor analysis and relative important index "RII"

### 4.6.1 Factor interpretation

Factor analysis used to examine the inter-relationships among the 87 statement in attempt to reduce the number of statement into a small number of factors.

The ten-factor solution accounted for about 53.685 % of total variance table (3.9). The factors were then examined to identify the number of items that were loaded on each factor. The ten-factor solution, with respective loading scores is presented in table (4.75). The result were assessed and numbered in descending order of the amount of variance to determine the underlying features. Each factor was subjectively labeled in accordance with sets of individual items.

First factor, (*The ability of women to work in the field of engineering*), accounted for 7.053% of the total variance and comprises 8 items. The majority of items had relatively high factor loading ( $>0.70$ ).

Second factor, (*Male dominance on the engineering profession*), accounted for 7.028% of the total variance and comprises 8 items. The majority of items had relatively high factor loading ( $>0.70$ ).

Third factor, (*The personal qualities of an engineer engineering women*), accounted for 6.349% of the total variance and comprises 5 items. The majority of items had relatively high factor loading ( $>0.70$ ).

Fourth factor, (*Social value and prestige related with engineer*), accounted for 5.643% of the total variance and comprises 6 items. The majority of items had relatively high factor loading ( $>0.60$ ).

Fifth factor, (*Work environment and working hours*), accounted for 5.554% of the total variance and comprises 6 items. The majority of items had relatively high factor loading ( $>0.60$ ).

Sixth factor, (*Family and parents*), accounted for 5.248% of the total variance and comprises 6 items. The majority of items had relatively high factor loading ( $>0.70$ ).

Seventh factor, (*Discrimination against women*), accounted for 4.634% of the total variance and comprises 3 items. The majority of items had relatively high factor loading ( $>0.60$ ).

Eighth factor, (*Historical role of women*), accounted for 4.559% of the total variance and comprises 3 items. The majority of items had relatively high factor loading ( $>0.60$ ).

Ninth factor, (*Culture*), accounted for 3.854% of the total variance and comprises 2 items. The majority of items had relatively high factor loading ( $>0.60$ ).

**Table (4.75): Result of factor analysis**

Statement	Factor loading
<b>Factor1: (The ability of women to work in the field of engineering)</b>	
Women physically unsuited to allocate engineering as men..	.705
Women over the age of forty are not appropriate for work in your field as men in the same age.	.702
Limited number of leave days affect the choice of engineering as a profession for women	.632
Women with young children cannot work at the site.	.599
Vacations abound with a married woman and have young children.	.593
Women take more vacation than men.	.559
Prevail engineered the idea that leaving them to work in the field of engineering, it will eliminate the male unemployment.	.552
Religiosity women play a key role in the decision-making for women's Employment.	.511
<b>Factor2: (Male dominance on the engineering profession),</b>	
Male dominance on some engineering disciplines prevents women from choosing engineering.	.790
I studied engineering in order to work in the field of family business.	.721
the choice of specialization in engineering	.717
Male dominance on the senior administrative positions	.597
accounting, legal or doctor more attractive and popular for women of being an engineer	.584
The small number of Employment women in our society has led to fewer and inefficient kindergarten "nursery".	.573
The surrounding environment and the prevailing societal culture affecting the work of women in the field of engineering.	-.565
Inability to balance between the demands of work and family is a major cause in the reluctance of many women for engineering work.	.552
<b>Factor3: (The personal qualities of an engineer engineering women),</b>	
The high cost of engineering study impact on my decision to choice Engineering.	.717
Few women find a good jobs	.716
My dream to be engineering leads me to choice this profession.	.714
Financially level of my family leads me to study engineering.	.713
Men's preference than women to work effect the selection of the engineering profession.	.615
<b>Factor4: (Social value and prestige related with engineer)</b>	
There is a need for engineering disciplines to provide more knowledge about the opportunity to employ women.	.670
Women expect to have a successful career in engineering because they have enough knowledge of this specialization.	.660
Women familiar with the opportunities available for the job in engineering disciplines.	.653
Women wish to have a large number of children are more attracted to other sectors of the engineering	.586
Equality between men and women in obtaining and function increases the popularity of specialty engineering.	-.583
Women Employment in engineering adversely affect family stability.	.547
<b>Factor5: (Work environment and working hours)</b>	
The nature of the work in engineering fields promotes the presence of women.	.669
Travels between work sites are not suitable for women.	.632
Women are less likely to work in high temperatures weather.	.612
Personal protective equipment is not suitable for women.	.588
Harsh Employment environment is not suitable for Employment women	.557
Some materials and tools used in engineering make a problem for women.	.521
<b>Factor6: (Family and parents)</b>	
One of my family member has a significant effect the choice of specialization in engineering	.722
my Friends have significant effect the choice of specialization in engineering	.647
choice of specialization in engineering	.610
The profession of my parents have a significant impact on the	.582
Confined my optional for the engineering profession on obtain high average in high school.	.561

**Table (4.75): Result of factor analysis**

Statement	Factor loading
<i>Factor 7: (Discrimination against women),</i>	
Inadequate service facilities such as toilets , ablution and place of prayer	.643
The man can do everything as well as for women.	.627
Women fit administrative work more than work at the sites.	.514
<i>Factor 8: (Historical role of women),</i>	
I would encourage other women to choose Employment sectors other than engineering.	.662
Provide grants and university loans impact on my choice of Engineering.	.619
Prestige of engineering career leads me to choice this profession.	.522
<i>Factor 9: (Culture),</i>	
Engineering women subjected to harassment in the workplace	-.517
Difficult to get women to the supervisory position affect the choice of profession in engineering	.506
<i>Factor 10: (group number 10)</i>	
Preference for men over women when hiring affect the choice of profession in engineering.	.712
The historical role played by women and men in society make men less receptive to their women colleagues.	.567

## 4.6.2 Comparison between the result from factor analysis and relative important index "RII"

**Table (4.76): Comparison between the result from factor analysis and relative important index "RII"**

Ranking of attributes			Factor analysis- components extracted			
Attributes	RII	Rank	Reason ID	Reason description/factor name	Factor loading	% variance explained
Women's have active role in the engineering work.	85.13	1	X57	<b>Factor1: (The ability of women to work in the field of engineering)</b>	.705	7.053
Women can build a successful career in engineering.	84.62	2	X56	Women physically unsuited to allocate engineering as men..	.702	
Women can contribute and add new in engineering through her work.	84.10	3	X55	Limited number of leave days affect the choice of engineering as profession for women	.632	
There is a need for engineering disciplines to provide more knowledge about the opportunity to employ women.	82.05	4	X59	Women with young children cannot work at the site.	.599	
Few women find a good jobs	81.54	5	X60	Vacations abound with a married woman and have young children	.593	
Male discrimination against women refer to their belief that the role of women confined to the home and raising children.	81.03	6	X58	Women take more vacation than men.	.559	
Equality between men and women in obtaining and function increases the popularity of specialty engineering.	80.51	7	X39	Prevail engineered the idea that leaving them to work in the field engineering, it will eliminate the male unemployment.	.552	
Women fit administrative work more than work at the sites.	77.95	8	X20	Religiosity women play a key role in the decision-making for women's Employment.	.511	
Women expect to have a successful career in engineering because they have enough knowledge for this specialization.	77.44	9	X9	<b>Factor2: (Male dominance on the engineering profession),</b>	.790	
Evening work is not appropriate for women.	76.92	10	X8	Male dominance on some engineering disciplines prevents women from choosing engineering.		
The nature of the work in engineering fields promotes the presence of women.	76.00	11	X7	I studied engineering in order to work in the field of family business.	.721	
Women wish to have a large number of children are more attracted to other sectors of the engineering	75.90	12	X10	the choice of specialization in engineering	.717	
From my experience, I think that the traditional role of women as wives and mother affect the accepted work in the field.	74.87	13	X66	Male dominance on the senior administrative positions	.597	
The surrounding environment and the prevailing societal culture affecting the work of women in the field of engineering.	74.36	14	X24	accounting, legal or doctor more attractive and popular for women of being an engineer	.584	
Discrimination reflect negative image when women choice her career.	73.85	15	X26	The small number of Employment women in our society has led to fewer and inefficient kindergarten "nursery".	.573	
				The surrounding environment and the prevailing societal culture	-.565	

**Table (4.76): Comparison between the result from factor analysis and relative important index "RII"**

Ranking of attributes			Factor analysis- components extracted			
Attributes	RII	Rank	Reason ID	Reason description/factor name	Factor loading	% variance explained
				affecting the work of women in the field of engineering.		
Customs and traditions in a community affect my actions in the field of employment	73.85	16	X23	Inability to balance between the demands of work and family is a major cause in the reluctance of many women for engineering work.	.552	
Society's perception of women throughout the wife only makes it less likely for the selection of the engineering profession.	73.33	17	X82	<b>Factor3: (The personal qualities of an engineer engineering women),</b>		6.349
				The high cost of engineering study impact on my decision to choose Engineering.	.717	
Pregnant engineering women who work in the workplace discrimination suffered the highest percentage compared to other employment sectors.	73.33	18	X69	Few women find a good jobs	.716	
Irregular Employment days is not appropriate for women	71.38	19	X79	My dream to be engineering leads me to choice this profession.	.714	
Men's preference than women to work effect the selection of the engineering profession.	71.28	20	X80	Financially level of my family leads me to study engineering.	.713	
Women prefer jobs in sectors such as teaching, trade more than engineering specialty.	70.26	21	X70	Men's preference than women to work effect the selection of the engineering profession.	.615	
Women in the workplace are respected as a man.	70.26	22	X74	<b>Factor4: (Social value and prestige related with engineer)</b> There is a need for engineering disciplines to provide more knowledge about the opportunity to employ women.	.670	5.643
Engineering women subjected to harassment in the workplace	70.26	23	X73	Women expect to have a successful career in engineering because they have enough knowledge for this specialization.	.660	
Chance of women to get supervisory position in the workplace is unfair.	70.26	24	X72	Women familiar with the opportunities available for the job in engineering disciplines.	.653	
Lack of facilities equipped to care for children in our society affect women to choose engineering profession.	69.74	25	X18	Women wish to have a large number of children are more attracted to other sectors of the engineering	.586	
Customs and tradition play a major role in the decision to specialize in engineering.	69.74	26	X75	Equality between men and women in obtaining and function increases the popularity of specialty engineering.	-.583	
Increase the number of women in engineering contributes in improving the performance of work.	69.23	27	X64	Women Employment in engineering adversely affect family stability.	.547	
Inability to balance between the demands of work and family is a major cause in the reluctance of many women for engineering work.	69.23	28	X44	<b>Factor5: (Work environment and working hours)</b>		5.554
				The nature of the work in engineering fields promotes the presence of women.	.669	
Women less receptive to work in an unsafe environment than men.	68.92	29	X48	Travels between work sites are not suitable for women.	.632	
Long working hours effect women to the choice profession in engineering.	68.92	30	X47	Women are less likely to work in high temperatures weather.	.612	

**Table (4.76): Comparison between the result from factor analysis and relative important index "RII"**

Ranking of attributes			Factor analysis- components extracted			
Attributes	RII	Rank	Reason ID	Reason description/factor name	Factor loading	% variance explained
There are those who believe in the proverb (We appreciate women but do not give them a place).	68.72	31	X49	Personal protective equipment is not suitable for women.	.588	5.248
Inadequate service facilities such as toilets , ablution and place of prayer	68.72	32	X50	Harsh Employment environment is not suitable for Employment women	.557	
Harsh Employment environment is not suitable for Employment women	68.31	33	X42	Some materials and tools used in engineering make a problem for women.	.521	
The women can do everything as well as for men.	68.21	34	X1	<b>Factor6: (Family and parents)</b> One of my family member has a significant effect in the choice of specialization in engineering	.722	
Some things are related to the nature of women not suitable for work in the field of engineering.	68.21	35	X3	my Friends have significant effect in the choice of specialization engineering	.647	
Women respected in engineering.	67.69	36	X2	choice of specialization in engineering	.610	
Low number of women in engineering contributes to the shortage of skills in the profession.	67.69	37	X5	The profession of my parents have a significant impact on the	.582	
Vacations abound with a married woman and have young children.	67.18	38	X4	Confined my optional for the engineering profession on obtain h average in high school.	.561	4.634
Religiosity women play a key role in the decision-making for women's employment .	67.18	39	X43	<b>Factor 7: (Discrimination against women),</b> Inadequate service facilities such as toilets , ablution and place of prayer	.643	
My dream to be engineering leads me to choice this profession.	67.18	40	X34	The man can do everything as well as for women.	.627	
Women are less likely to work in high temperatures weather.	66.15	41	X33	Women fit administrative work more than work at the sites.	.514	
Provide job opportunities in the field of engineering impact on the selected engineering discipline.	66.15	42	X67	<b>Factor 8: (Historical role of women),</b> I would encourage other women to choose Employment sectors other than engineering.	.662	4.559
accounting, legal or doctor more attractive and popular for women of being an engineer	65.64	43	X81	Provide grants and university loans impact on my choice of Engineering.	.619	
Prestige of engineering career leads me to choice this profession.	65.13	44	X78	Prestige of engineering career leads me to choice this profession.	.522	
my parents have a significant effect in the choice of specialization in engineering	65.13	45	X28	<b>Factor 9: (Culture),</b> Engineering women subjected to harassment in the workplace	-.517	3.854
High prices facilities special for children affect women to choose engineering profession.	65.13	46	X13	Difficult to get women to the supervisory position affect the cho of profession in engineering.	.506	



**Table (4.76): Comparison between the result from factor analysis and relative important index "RII"**

Ranking of attributes			Factor analysis- components extracted			
Attributes	RII	Rank	Reason ID	Reason description/factor name	Factor loading	% variance explained
Social level of engineering leads me to choice this profession.	64.62	47	x12	<b>Factor 10: (group number 10)</b> Preference for men over women when hiring affect the choice of profession in engineering.	.712	3.763
Preference for men over women when hiring affect the choice of profession in engineering.	64.62	48	x17	The historical role played by women and men in society make men less receptive to their women colleagues.	.567	
The historical role played by women and men in society make men less receptive to their women colleagues.	63.59	49				
The desire to raise the standard of living for my family a major reason for my departure to work	63.59	50				
Difficult to get women to the supervisory position affect the choice of profession in engineering.	62.56	51				
The profession of my parents have a significant impact on the choice of specialization in engineering	62.05	52				
Engineers subjected to verbal flirting and harassment at work.	62.05	53				
Confined my optional for the engineering profession on obtain high average in high school.	61.54	54				
Level of education of my parents has a significant effect in the choice of specialization in engineering	60.51	55				
One of my family member has a significant effect in the choice of specialization in engineering	60.00	56				
Travels between work sites are not suitable for women.	59.69	57				
Personal protective equipment is not suitable for women.	58.97	58				
Male dominance on the senior administrative positions affect women's choice of profession in engineering.	58.97	59				
A man more suited than women's for disciplines of engineering.	58.97	60				
Women physically unsuited to allocate engineering as men.	58.46	61				
Some materials and tools used in engineering make a problem for women.	58.46	62				
Women familiar with the opportunities available for the job in engineering disciplines.	57.44	63				
my Friends have significant effect in the choice of specialization in engineering	57.44	64				

**Table (4.76): Comparison between the result from factor analysis and relative important index "RII"**

Ranking of attributes			Factor analysis- components extracted			
Attributes	RII	Rank	Reason ID	Reason description/factor name	Factor loading	% variance explained
Male dominance on some engineering disciplines prevents women from choosing engineering.	57.44	65				
Women with young children cannot work at the site.	56.92	66				
Women take more vacation than men.	56.41	67				
I have discriminated in my work because I am women.	56.41	68				
Limited number of leave days affect the choice of engineering as a profession for women	56.00	69				
The small number of Employment women in our society has led to fewer and inefficient kindergarten "nursery".	55.90	70				
Prevail engineered the idea that leaving them to work in the field of engineering, it will eliminate the male unemployment.	55.90	71				
I would encourage other women to choose Employment sectors other than engineering.	54.87	72				
A low concentration of women and their productivity at work when they are married and have children.	54.36	73				
Man has experienced more than women in engineering fields.	53.85	74				
Women over forty years old are not appropriate for work in your field as men in the same age.	53.33	75				
Lack of job opportunities in the future leads me to study another profession.	53.33	76				
Women Employment in engineering adversely affect family stability.	52.82	77				
Financially level of my family leads me to study engineering.	48.21	78				
Employment women in the field of engineering does not have the opportunity to develop the same as her male colleagues.	45.13	79				
Provide grants and university loans impact on my choice of Engineering.	43.59	80				
The high cost of engineering study impact on my decision to choice Engineering.	42.05	81				
I studied engineering in order to work in the field of family business.	42.05	82				

Table (4.76) indicated that the number and ranking of items in two analysis methods are different, in first group number of items in relative important index is 12 and in factor analysis 8 items, in second group number of items in relative important index is 12 and in factor analysis 7 items and so on.

## CHAPTER 5

### CONCLUSIONS AND RECOMMENDATIONS

#### 5.1 Introduction

This chapter includes the conclusions and recommendations to employment engineering women, unemployment engineering women and female students in different engineering discipline in Gaza strip. This research aims to investigate the factors influencing the choices of career in different engineering disciplines by women in Gaza Strip.

This research had four primary objectives which were achieved through the data collection using survey techniques and the detail analysis of the survey results. The first objective was to compare between different engineering disciplines related to the factors affecting women career choice. The second objective was investigating the attitude of engineering women concerning developing their future career. And barriers to women entering and working within different engineering discipline. The third objective was determining the popularity of some engineering disciplines as career for women. And the last objective was investigating the relationship between culture background and the effect of perceived image of the engineering disciplines on recruiting the women

This research has six hypotheses which were tested through the data collection using survey techniques and the detail analysis of the survey results. The first null hypothesis was women have ability to work in the field of engineering and the alternative hypothesis was women don't have the ability to work in the field of engineering. The second null hypothesis male dominance of some engineering disciplines is a primary negative factor that discourages women from embarking on careers in engineering and the alternative hypothesis was male dominance of some engineering disciplines is a primary negative factor that discourages women from embarking on careers in engineering. The third null hypothesis was the work environment of some engineering disciplines militates against women's ability to work and the alternative hypothesis was the work environment of some engineering disciplines that help women's to work. The fourth null hypothesis was family and parents have significant effect on women choice her career in engineering and the alternative hypothesis was family and parents don't have significant effect on women choice her career in engineering. The fifth null hypothesis was discrimination against women discourages women from choosing career in engineer and the alternative hypothesis was discrimination against women encourages women from choosing career in engineer. And the last null hypothesis was the cultural upbringing of women influences their choice of careers in the engineering disciplines and alternative hypothesis was the cultural upbringing of women doesn't influence their choice of careers in the engineering disciplines.

These objectives and hypotheses were achieved through two interdependent phases. The first phase included an intensive literature review. This phase was necessary to identify potential factors that affect the choices of career in different engineering disciplines by women. The literature review and pilot interviews helped in

identifying 87 potential factors which are grouped into ten groups. These groups are the ability of women to work in the field of engineering, male dominance on the engineering profession, the personal qualities of an engineering woman, social value and prestige related with engineering, work environment and working hours, family and parents, discrimination against women, historical role of women, culture, group number ten. Also this research highlights on the basis upon which women choose her careers in engineering and the most factor effecting on women to choose other sector than engineering and the popularity of some engineering disciplines as career for women.

The second phase included the necessary steps in collecting all required information. A questionnaire was sent to 200 engineering sample they are working engineering women, unemployment women and female students' sample. Only 175 questionnaires returned from engineering women. Also there is another questioner for company to study the perception of company about engineering women, 50 questionnaires was distributed to different company working in engineer.

## 5.2 Conclusion

*Objective 1: Factors was affecting women career choice.*

Factor related to the personal qualities of engineering women. This factor ranked in the first position with RII 75.73 and this factor have seven factor related to this point "women's have active role in the engineering work" was ranked in first position, "women can contribute and add new in engineering through her work" was ranked in second position and "The small number of working women in our society has led to fewer and inefficient kindergarten "nursery" was ranked in last position.

Factor related to the discrimination against women. This factor ranked in second position in factor effecting women choose career with RII 68.89 and this factor have nine factor related to this point "male discrimination against women refer to their belief that the role of women confined to the home and raising children" was ranked in first position, "equality between men and women in obtaining and function increases the popularity of specialty engineering" was ranked in second position and "I have discriminated in my work because I am women" was ranked in last position.

Factor related to the male dominance on the engineering profession. This factor ranked in position number three with RII 65.71 and this factor have eleven factor related to this point "few women find a good jobs" was ranked in first position, "the surrounding environment and the prevailing societal culture affecting the work of women in the field of engineering" was ranked in second position and "male dominance on some engineering disciplines prevents women from choosing engineering" was ranked in last position.

Factor related to the work environment and working hours. This factor ranked in position number four with RII 65.40 and this factor have nine factor related to this point "evening work is not appropriate for women" was ranked in first position, "the nature of the work in engineering fields promotes the presence of women" was ranked in second position and "limited number of leave days affect the choice of engineering as a profession for women" was ranked in last position. The work

environment of engineering was discouraging women to choose careers in engineering.

Factor related to the social value and prestige related with engineer. This factor ranked in position number five with RII 63.81 and this factor have nine factor related to this point "women fit administrative work more than work at the sites" was ranked in first position, "from my experience, I think that the traditional role of women as wives and mother affect the accepted work in the field" was ranked in second position and "confined my optional for the engineering profession on obtain high average in high school" was ranked in last position.

Factor related to the group number ten. This factor ranked in position number six in factor effecting women choose career with RII 58.57 and this factor have four factor related to this point "increase the number of women in engineering contributes in improving the performance of work" was ranked in first position, "low number of women in engineering contributes to the shortage of skills in the profession" was ranked in second position and "I studied engineering in order to work in the field of family business" was ranked in last position.

Factor related to the culture. This factor ranked in position number seven in factor effecting women choose career with RII 49.05 and this factor have six factor related to this point "women in the workplace are respected as a man" was ranked in first position, "customs and tradition play a major role in the decision to specialize in engineering" was ranked in second position and "provide grants and university loans impact on my choice of engineering" was ranked in last position.

Factor related to the ability of women to work in the field of engineering. This factor ranked in position number eight with RII 51.9 and this factor have twelve factor related to this point "women prefer jobs in sectors such as teaching, trade more than engineering specialty" was ranked in first position, "lack of facilities equipped to care for children in our society affect women to choose engineering profession" was ranked in second position and "women working in engineering adversely affect family stability" was ranked in last position.

Factor related to the historical role of women. This factor ranked in position number nine in factor effecting women choose career with RII 49.05 and this factor have six factor related to this point "the historical role played by women and men in society make men less receptive to their women colleagues" was ranked in first position, "a man more suited than women's for disciplines of engineering" was ranked in second position and "the high cost of engineering study impact on my decision to choice engineering" was ranked in last position.

Factor related to the family and parents. This factor ranked in last position in factor effecting women choose career with RII 46.03 and this factor have nine factor related to this point "accounting, legal or doctor more attractive and popular for women of being an engineer" was ranked in first position, "my parents have a significant effect in the choice of specialization in engineering" was ranked in second position and "financially level of my family leads me to study engineering" was ranked in last position.

It is important to the engineering profession to know why women engineering prefer some engineering profession than other and what is the factor effect on them to choice this profession. Engineering has always been a male dominated profession. Despite the involvement of women in engineering field is growing, women are observed as minority in this field. The growing demand for qualified engineers will soon reach a critical level. According to Berrais (2010) jobs in the Arab world are growing most rapidly in areas that require science, engineering, information technology, and technical knowledge and skills. Some business leaders are warning of a major shortage in skilled Arab workers primarily in information technology and technical knowledge that threatens the ability to compete in international marketplace. However, universities and engineering industry have begun to recognize the need for women engineers and are actively recruiting young women to enter this field. This research must be done vs. the Gaza Strip since this research had not been done before full comprehensive extensively in this area and then compare them with some of the previous studies.

**Table (5.1) Factors was affected women career choice**

Rank	Groups
<b>Personal qualities of an engineer engineering women</b>	
<b>First</b>	<b>Women have</b> active role in the engineering work.
<b>Second</b>	<b>Women can contribute and add new in engineering</b> through her work
<b>Last</b>	The small number of working women in our society has led to fewer and inefficient kindergarten "nursery"
<b>Discrimination against women.</b>	
<b>First</b>	male discrimination against women refer to their belief that the role of women confined to the home and raising children
<b>Second</b>	<b>equality</b> between men and women in obtaining and function increases the popularity of specialty engineering
<b>Last</b>	I have discriminated in my work because I am women
<b>Male dominance on the engineering profession</b>	
<b>First</b>	<b>few women</b> find a good jobs
<b>Second</b>	the surrounding environment and the prevailing societal culture affecting the work of women in the field of engineering
<b>Last</b>	male dominance on some engineering disciplines prevents women from choosing engineering
<b>Work environment and working hours</b>	
<b>First</b>	<b>Evening</b> work is <b>not</b> appropriate for women
<b>Second</b>	<b>The nature of the work in engineering fields</b> promotes the presence of women
<b>Last</b>	<b>Limited number</b> of leave days affect the choice of engineering as a profession for women
<b>Social value and prestige related with engineer</b>	
<b>First</b>	Women fit administrative work more than work at the sites
<b>Second</b>	From my experience, I think that the traditional role of women as wives and mother affect the accepted work in the field
<b>Last</b>	<b>Confined</b> my optional for the engineering profession on obtain high average in high school
<b>Culture</b>	
<b>First</b>	women in the workplace are respected as a man
<b>Second</b>	customs and tradition play a major role in the decision to specialize in engineering
<b>Last</b>	<b>provide</b> grants and university loans impact on my choice of engineering
<b>Ability of women to work in the field of engineering</b>	
<b>First</b>	<b>Women</b> prefer jobs in sectors such as teaching, trade more than engineering specialty
<b>Second</b>	Lack of facilities equipped to care for children in our society affect women to choose engineering profession
<b>Last</b>	Women working in engineering adversely affect family stability
<b>Historical role of women</b>	
<b>First</b>	The historical role played by women and men in society make men less receptive to their

**Table (5.1) Factors was affected women career choice**

Rank	Groups
	women colleagues
<b>Second</b>	<b>A man more</b> suited than women's for disciplines of engineering
<b>Last</b>	<b>The high cost of</b> engineering study impact on my decision to choice engineering
Family and parents	
<b>First</b>	accounting, legal or doctor more attractive and popular for women of being an engineer
<b>Second</b>	my parents have a significant effect in the choice of specialization in engineering
<b>Last</b>	<b>financially level</b> of my family leads me to study engineering

*Objective 2: The attitude of engineering women concerning developing their future career. And barriers to women entering and working within different engineering discipline.*

The attitude of engineering women were concerning developing their future career. High rate in high school was ranked in the most affecting factor on women when she choice her career. flowed by exploration of the unknown and high social value of engineer and high cost of engineering study was ranked in the last position of the factor effecting on women when choosing her career.

Barriers to women entering and working within different engineering discipline. The discriminatory environment of engineering profession was ranked in first position in the most factors effecting on women when choosing their career followed by male dominance of engineering profession and financial prospects. But discrimination in site ranked in the last position of the factor effecting on women when choosing her career.

*Objective 3: the popularity of some engineering disciplines as career for women.*

Architect engineering discipline is the most attractive engineering discipline for women. Follow by computer engineering discipline, follow by civil engineering discipline, and follow by communication engineering discipline and industry engineering discipline ranked in last position of attractive engineering discipline for women. This result is very important to work field and company, also very important to university in developing planning.

*Objective4: the relationship between culture background and the effect of perceived image of the engineering disciplines on recruiting the women*

There is a relationship between the women's choice of careers in engineering and their cultural beliefs as these were informed in their upbringing and determined by their historical backgrounds. Culture has a major influence on why women have chosen or been restricted from choosing different discipline of engineering. So women who seek entry into male-dominated cultures either have to act like men in order to be successful, or leave if they are not adaptable to the culture, or they can remain in the industry without behaving like men but maintaining unimportant positions. Women working in some engineering discipline are faced up to several difficulties within male culture and women consider themselves very much in a minority.

### *Companies' attitude with engineering women*

Most of company fields is consulting and contracting, most company have less than 5 women employee, most of women working in companies don't work in engineering fields, most of companies give women equal chance as men in work office, most company give women same chance as men in task work in site, little number of company provide separate facilities to women, about half of companies have clear and explicit policy in the non-discrimination when hiring, training and gathering information on the basis of sex, most companies give women a chance to get promoted within the structure of the company and most companies get finance support in order to improve the status and skills of women working.

### **5.3 Recommendations**

*The following recommendations are the most important ones that can be deduced by this research:*

1. The working conditions for women need to be improved.
2. Current legislation must be enforced combined with an engineer association specifying and prescribing modern and safe working conditions.
3. Enhance the personal qualities of engineering women to compete in the labor market.
4. Eliminate the discrimination against women in engineering working site.
5. Increase the quota of employment the women to eliminate the male dominance on the engineering profession.
6. Try to change the traditional culture about working women in different engineering discipline.
7. Enhance the knowledge of some engineering discipline by show success model of engineering women in these disciplines.
8. Conferencing the story about the creative engineering women.
9. Enhanced the employment condition of engineering women.

### **5.4 Further recommended studies**

#### *The reality of Engineers in the Gaza Strip*

The study found that engineering women did not have enough knowledge about different engineering discipline. It is recommended that a future study on the successful women in engineering is needed to establish how they overcame some of the challenges in work environment.

#### *Role and effect of supporting on engineering women*

An engineer association must encourage engineering women, join them and network with other working women or women in leadership positions. Government must support them by helping with funding and provide jobs for engineering women as projects or temporary work contract.



### *Factors affecting women career choice in other sector.*

It is further recommended that this future study would have to look extensively at other sectors that women prefer careers in, which were also previously male dominated such as; for example, layer, medicine, pharmacy and Science, to identify what these industries did to attract more women. The study would also have to look at the industries that have always been attractive to women such as teaching, nursing and social sciences to determine the success rate of women in comparison to engineering in order to learn and establish ways in which to improve popularity and compatibility of engineering careers among Palestinian women.

### *Aspirations and hopes Palestinian engineer*

It is further recommended that this future study would have to look extensively at the aspiration and hopes of women engineering. What she wanted to be and how she looking for her in the future, how women engineer look to the future of engineering in Gaza strip.

### *Problems facing the Palestinian Engineers*

It is further recommended that this future study would have to look extensively at problems facing engineering women like jobless, and teach engineering women to enhance their skills and teach them which skills requires to competing in in job marketing, how can they globalize and marketing their self.

## References

- Abu Nahleh, L., Kuttab, E. and Nasser, R. 2006 'Palestinian Women's Empowerment: An Assessment, Women Studies Institute, Birzeit University, Palestine. (UNESCO study), [retrived on 20/3/2012] at [http://home.birzeit.edu/wsi/images/stories/A\\_study\\_for\\_UNESCO\\_Empowerment.pdf](http://home.birzeit.edu/wsi/images/stories/A_study_for_UNESCO_Empowerment.pdf).
- Agapiou, A. 2002 'Perceptions of gender roles and attitudes towards among male and female operatives in the Scottish construction industry', *Construction Management and Economics*, Vol. 20, No. 8, PP.697-706.
- Al Gurg, Raja 2006 'UAE Women in business an overview of the past, present & future', *A Presentation by The President of Dubai Business Woman Council*, available at [http://www.aiwfonline.co.uk/downloads/Dec\\_2010\\_20PS1\\_20Speech\\_20\\_20Raja\\_20Al\\_20Gurg.pdf](http://www.aiwfonline.co.uk/downloads/Dec_2010_20PS1_20Speech_20_20Raja_20Al_20Gurg.pdf) (2010, 2) retrieved on 1.3.2012.
- Alexander, P., Holmner, M., Lotriet, H., Matthee, M., Pieterse, H., Naidoo, S., Twinomurinzi, H. and Jordaanb, D. 2010 'Factors affecting career choice: Comparison between female students from computer and other disciplines', *Journal of Science Education and Technology*, Vol. 20, No. 3, PP.300-315.
- Arslan, O. and Kivrak, S. 2004 'The lower employment of women in Turkish construction sector', *Building and Environment*, Vol.39, PP. 1379 – 1387.
- Aulin, R. and Jingmond, M. 2011 'Issues confronting women participation in the construction industry,' *Advances in Engineering and Technology - Contribution of Scientific Research in Development Conference*, Entebbe, Uganda 31/1/2011, PP.312-318. [retrieved on 20/8/2012] at: < <http://lup.lub.lu.se/luur/download?func=downloadFile&recordOId=1834659&fileOId=1834668> >.
- Azizzadeh, A., McCollum, C., Miller, C., Holliday, K., Shilstone, H. and Lucci, A. 2003 'Factors Influencing Career Choice among Medical Female students Interested in Surgery', *Journal of current Surgery*, Vol.60, No.2, PP. 210-213.
- Baboolal, N. and Hutchinson, G. 2007 'Factors affecting future choice of Specialty among first-year female students of the University of the West Indies, Trinidad.' *Journal of Medical Education*', Vol.41, PP. 50-56.
- Badekale, A. 2003 'Women and engineering in Nigeria: towards improved policy initiatives and increased female participation,' *ATPS Working Paper Series*, No. 37, Published by the African Technology Policy Studies Network.
- Badolato, L. 1998 'Recognizing and meeting the special needs of gifted females', *Gifted Child Today*, Vol.21, No.6, PP.32-37.
- Baron, J. and Newman, A. 1990 'For what it's worth: organizations, occupations and the value of work done by women and nonwhites', *American Sociological Review*, Vol.55, PP.115-75.
- Baytiyeh, H. 2012 " Women, engineers in the Middle East from enrollment to career: a case study" *American Society for Engineering Education*, Vol. 26 No. 5, PP.1192-1199.
- Bell, J., (2005), "Doing your research project", RefineCatch Ltd, UK.

- Berrais, A. 2010 Arab Women in Engineering Education: Current State and Future Perspective, Conference proceedings of the 1st Symposium of Female Higher Education: Trends and Perspectives, Taibah University, pp.77 – 85, 4-6 January, [retrieved on 1/9/2012] at [http://www.google.ps/ Arab Women in Engineering Education: Current State and Future](http://www.google.ps/Arab%20Women%20in%20Engineering%20Education%3A%20Current%20State%20and%20Future) = [http://Ftaibahuevents.com Fstudies FAbbes Berrais.doc](http://Ftaibahuevents.com/Fstudies/FAbbes/Berrais.doc).
- Betz, N. and Eitzgerald, L. 1987 'The career psychology of women,' *New York Academic Press*, ISBN 0120944057, (retrieved on 4/9/2012) at [http://books.google.ps/books/The career psychology of women](http://books.google.ps/books/The%20career%20psychology%20of%20women).
- Birgit, M. 2002 'Gender and subject decision at university: Gender specificity in subject perception and decision,' *Equal Opportunities International*, Vol. 21, No.1, PP.1-22.
- Bon, R. and Hughes, W. 1992 'Managing the ability gap,' *Construction Management and Economics journal*, Vol.10, No.4, PP. 13-17.
- Booz and Company 2010 'Women's employment in Saudi Arabia: a major challenge,[retrieved on 2.3.2012 at [http://www.booz.com/me/home/what\\_we\\_think/40007409/40007869/1](http://www.booz.com/me/home/what_we_think/40007409/40007869/1).
- Borchert, M 2002 ' Career choice factors of high school female students ,' *Unpublished M.SC Thesis of The Not working School, University of Wisconsin-Stout Menomonie, WI 54751*.
- Bryant, B., Zvonkovic, A. and Reynolds, P.2005 'Parenting in relation to children and adolescent vocational development', *Journal of vocational behaviors*, Vol.69, PP.149-175.
- Burlin, F. 1976 'The relationship of parental education and maternal work and occupational status to occupational aspiration in adolescent females', *Journal of Vocational Behavior*, Vol.9, PP.99-104.
- Carter, R. and Kirkup, G. 1990 'Critical Influences in the career choice of engineering womens', *U.S. Engineering women*, Vol.36, No.1, PP.23-25.
- Chen, W. T., and Chen, T. T., (2007),”Critical success factors for construction partnering in Taiwan”, *International Journal of Project Management*, Vol. 25, pp. 475–484
- Cheng, M., Tsai, M., Xiao, Z. 2006 'Construction management process reengineering: Organizational human resource planning for multiple projects', *Automation in Construction*, Vol.15, PP.785–799.
- Chileshe, N. and Haupt, T. 2010 'An Empirical analysis of factors impacting career decisions in South African construction industry male and female high school female students' perspectives,' *Journal of Engineering, Design and Technology*, Vol. 8, No. 2, PP. 221-239.
- Chowwen, O. 2003 'Experience above the glass ceiling: A study of female executive', *International Journal of Psychology in Africa*, Vol.11, No.1, PP.138-146.
- Clarke, L., Pedersen, F., Michielsens, E. and Susman, B. 2005 'The European construction social partners: Gender equality in theory and practice', *European Journal of Relations*, Vol.11, No.2, PP.151-177.

- Cleveland, J. and Kerst, M. 1993 'Sexual harassment and perceptions of power: An under-articulated relationship', *Journal of Vocational Behavior*, Vol.42, No.2, PP.49-67.
- Construction Industry Training Board Annual Report "CITB" Construction Skills, 2003 [retrieved on 2/6/2012] at <  
[http://www.cskills.org/uploads/annual\\_report\\_2003\\_tcm17-6109.pdf](http://www.cskills.org/uploads/annual_report_2003_tcm17-6109.pdf) >.
- Cunningham, M. 2001 'Parental influence on gendered division of house work.' *American Sociological Review*, Vol.66, No.2, PP.184-203.
- Cutler, J., Alspector, S., Harding, K., Wright, L. and Graham, M. 2006 'Medical female students perception of psychiatry as a career choice', *Academic Psychiatry*, Vol.30, No.2, PP.144-149.
- Dainty, A. and Edwards, D. 2003 'The UK building education recruitment crisis: a call for action', *Construction Management and Economics journal*, Vol.21, PP.767-775.
- Dainty, A. and Edwards, D. 2003 'The UK building education recruitment crisis: a call for action', *Construction Management and Economics journal*, Vol.21, PP.767-775.
- Dainty, A., Bagihole, B. and Neale, R. 2000 'A grounded theory of women's career underachievement in large UK construction companies', *Construction Management and Economics*, Vol. 18, No. 2, PP.239-50.
- Dainty, A., Bagilhole, B. and Neale, R. 2001 'Male and female perspectives on equality measures for the UK construction sector', *Women in Management Review*, Vol. 16, No. 6, PP. 297-304.
- Davis, C. 2002 'Female participation in the labor force,' *Swarthmore College Women's Studies*, [retrieved on 18.2.2012] at  
<http://fubini.swarthmore.edu/~WS30/CDfinal.html>.
- Domenico, D. and Jones, K. 2006 'Career aspirations of women in the 20th century', *Journal of Career and Technical Education*, Vol.22, No.2, PP.1-7.
- Dryburgh, H. 1999 'Work hard, play hard: women and working ization in engineering –adapting to the culture', *Gender and Society*, Vol. 13, No. 5, PP. 664-82.
- Equal Opportunities Commission "EOC", 2000 'Women and Men in Britain', *The Labour Market: Manchester*, [retrieved on 7/6/2012], at <  
[http://www.equalityhumanrights.com/uploaded\\_files/PSD/wp51\\_gender\\_statistics\\_evaluation.pdf](http://www.equalityhumanrights.com/uploaded_files/PSD/wp51_gender_statistics_evaluation.pdf)>.
- Ercog-Hurn, D., Mirosevich, V. 2008'Modern Robust Statistical Methods,' an easy way to maximize the accuracy and power of your research" [retrieved on 3/9/2012] <  
[www.unt.edu/rss/class/mike/.../robustAmerPsyc.pdf](http://www.unt.edu/rss/class/mike/.../robustAmerPsyc.pdf)>.
- Evetts, J. 1998 'Managing the technology but not the organization: women and career in engineering', *Women in Management Review*, Vol. 13, No. 8, PP.283 – 290.
- Fellows, R., and Liu, A., (2008), "Research methods for construction", Blackwell Science Ltd., Third edition.

- Ferguson, T. and Sharples, M. 1994 'Blue collar women: trailblazing women take on men-only jobs. *Liberty corner, New Jersey: New Horizon Press*. ISBN 0-88282-092-3 Inc). ISBN 0-88282-093-1 (pb).
- Fielden, S., Davidson, M., Gale, A. and Davey, C. 2000 'Women in construction: the untapped resource', *Construction Management and Economics*, Vol.18, PP.113–21.
- Fielding, J. and Glover, J. 1997 'Gender and science, engineering and technology', *Research Summary*, Roehampton Institute, University of Surrey.
- Fleming, L., Engerman, K. and Griffin, A. 2005 'Persistence in engineering education: experiences of first year female students at a historically black university', American Society of Engineering Education Conference, Research Brief Center for the Advancement of Engineering Education , NSF Grant: ESI-0227558.
- Frehill, M., Brandi, C., Di Fabio, N., Keegan, K., and Hill, T. 2009 'Women in engineering: A review of the 2008 literature', *SWE Magazine*, Vol. (55), PP. 28–56.
- Furlong, A. 1986 'Schools and the structure of female occupational aspirations.' *British Journal of Sociology of Education*, Vol.7, No.4, PP.367-377.
- Gale, A. 1994 'Women in non-tradition occupations – the construction industry', *Women in Management Review*, Vol. 9, No. 2, PP.3-14.
- Galloway, P. 2006 'The Need for Women in Engineering', vol.91 no.10 retrieved at 31/10/2012 on [www.jsce.or.jp/journal/thismonth/pdf/200610.pdf](http://www.jsce.or.jp/journal/thismonth/pdf/200610.pdf)
- Geertsema, R 2007 'Women in working and leadership positions in the construction industry in South Africa,' *Unpublished M.Sc Thesis of Tshwane University of Technology, South Africa*.
- Genetics, S 2003 'Statistical Analysis 1-way ANOVA,'[retrieved on 5/9/2012] at <http://www.originlab.com/index.aspx?go=Products/Origin/Statistics/ANOVA&pid=98> (2012)>.
- Georgiou, S. 1999 'Parental attributions as predictors of involvement and influences on child achievement.' *The British Journal of Educational Psychology*, Vol.69, No.3, PP.409-429.
- Greed, C. 2000 'Achieving Critical Mass', *Women in the Construction Professions*, Vol.7, No.3, PP.181-196.
- Hart, R 2007 'Women doing men's work and women doing women's work: Female work and pay in British wartime engineering,' *Journal of Explorations in Economic History*, Vol. 44, No.1, PP.114-130.
- Hill, C. 2010 ' Why So Few? Women in Science, Technology, Engineering, and mathematics', retrieved on 30/9/2012 at <http://www.aauw.org/learn/research/upload/whysofew.pdf>
- Hussein, N. 2009 Palestinian Institute for the Study of Democracy (Muwatin), Equality and Gender in Labour Legislation, [retrieved on 20/3/2012] at <http://www.muwatin.org/>>.

- Inter-parliamentary Union 2012, 'Women ' in national parliaments,' retrieved on 20.1.2012 at <http://www.ipu.org/wmn-e/world.htm>.
- Jayne, B., Marilyn, D., Andrew, G. 1999 'Women in construction: a comparative investigation into the expectations and experiences of female and male construction undernot workings and employees', *Women In Management Review*, Vol. 14, No. 7, PP. 273 – 292.
- Jones, W. and Larke J. 2005 'Enhancing the life for hispanic individuals through career preparation', *Journal of Hispanic Higher Education*, Vol.4, NO.1, PP.5-18.
- Kalaiselvi, S. 2009 'Financial performance in software industry,' 1<sup>st</sup> ed. House PVT.LTD. ISBN: 978-81-8356-428-1.
- Kallet, R. H., (2004), "How to write the methods section of a research paper", *Respiratory Care Journal Symposium*, October, 2004, Vol. 49, No. 10, pp.1229-1232.
- Kassim, A., Omolade, A. and Rachael, A. 2011 'Parental role in gender stereotyping in vocational education in 21st century, Nigeria', *Journal of Basic and Applied Scientific Research*, Vol.1, No.7, PP.627-633.
- Kirby, R. 1996, *European Engineering Yearbook*, Cambridge Market Intelligence, London, [retrieved on 15/7/2012] at <<http://books.google.ps/books/> European Engineering Yearbook 1996>.
- Koushki, P. Sanad, H. and Larkin, A. 1999 'Engineering womens in Kuwait: Perception of Gender Bias', *Journal of Engineering Education*, Vol.188, No.1, PP. 93-97.
- Kumbhar, D. 2011 'problem of construction worker', retrieved on 29/9/2012 at [http://shodhganga.inflibnet.ac.in/bitstream/10603/4063/13/13\\_chapter%208.pdf](http://shodhganga.inflibnet.ac.in/bitstream/10603/4063/13/13_chapter%208.pdf).
- Lane, N. 1997 'Women in science, engineering and technology: the rising tide report and beyond', in Maynard, M. (Ed.), *Science and the Construction of Women*, UCL Press, London.
- Lauer, R. 2010 'Social problems and the quality of Life. 6th ed. McGraw-Hill. ISBN: 0073528285, 9780073528281.
- Layne, M. 2009\_ 'Women in Engineering: Pioneers and Trailblazers', [retrieved on 6/4/2012] at <<http://books.google.ps/books?> women and working isation in engineering>.
- Louise, E. 2001 'Senior management in chartered surveying: where are the women?', *Women in Management Review*, Vol.16, No.6, PP.264 –278.
- Madikizela, K and Haupt, T 2010 'Influences on women's choices of careers in construction: a South African study', *Australasian Journal of Construction Economics and Building*, Vol. 10, PP. 1-15.
- Madikizela, K. 2008 "An analysis of the factors influencing the choices of careers in construction by South African women', *Unpublished Thesis of Durban University of Technology, South Africa*.
- Maharaj, S 2008 'investigation of the factors affecting the career choice of selected health-care female students (physiotherapy, chiropractic, medicine and

- occupational therapy) in kwazulu natal,' *Unpublished Thesis of Durban University of Technology, South Africa.*
- Matope, S. 2007 'A study into the factors that influence female engineering female students' career choice: a case study of Mutare Polytechnic, Zimbabwe', *Scientific Research and Essay*, Vol. 2, No.6, PP. 211-216.
- Mau, C., and Bikos, H. 2000 'Educational and vocational aspirations of minority and female female students: A longitudinal study', *Journal of Counseling and Development*, Vol.78, PP.186-194.
- Naoum, S.G., (2007), "Dissertation research and writing for construction student", Reed educational and professional publishing Ltd.
- Nelson, K and Veltri, N 2011 'Women in information technology careers: a person-process-context-time framework,' ECIS 2011 Proceedings, Paper 53 at <http://aisel.aisnet.org/ecis2011/53>.
- Newton, P. 1988 'How wise are we?: Should we encourage more women to become engineers?'," *Women In Management Review*, Vol. 3, No.1, PP.22 – 30.
- Noordenbos, G.2002 'Women in academies of sciences: From exclusion to exception,' *Women's Studies International Forum*, Vol.25, No.1, PP.127-137.
- "National Society of Working Engineers." National Society of Engineers, 14 Mar. 2012. Web. 29 Mar. 2012 retrieved on 30/9/2012 at <<http://www.nspe.org/index.html>>.
- "Nsf.gov 2012 - National Science Foundation - US National Science Foundation (NSF)." retrieved on 30/9/2012 at [www.Nsf.gov](http://www.Nsf.gov).
- Ofori, G 2011 'Women leaders breaking the glass ceiling in singapore's construction industry', *Journal of Working Issues in Engineering Education and Practice*, Vol. 137, PP.1-6.
- OriginLab, 2012 [retrieved on 6/9/2012] at <http://www.originlab.com/index.aspx?go=Products/Origin/Statistics/ANOVA&pid=98>.
- Osocki, A., White, J., Morago, S. and Van Sickle, J. (2006) 'Factors affecting science undernot workings choice of teaching as a career: A case study at Humoldt State University, [retrieved on 15/7/2012] at <[http://www.calstate.edu/teachered/msts/docs/CSUSummit\\_Factors.pdf](http://www.calstate.edu/teachered/msts/docs/CSUSummit_Factors.pdf)>.
- Otto, L. 2000 'Youth perspective on parental career influence', *Journal of Career Development*, Vol.27, No.2, PP.111-118.
- Palestinian Central Bureau of Statistics "PCBS" 2006 'Palestinians at the End of Year 2006. Ramallah- Palestine.
- Perreault, R. 1992 ' Identification of the issues facing women in the construction industry and their relative importance', *In: Proceedings of the 28th Annual Conference Auburn University - Auburn, Alabama April 9 - 11*, PP.129-136). [Retrieved on 5.3.2012] at: <<http://www.ascreditor.unl.edu/archives/1992/perreault92.htm>>.

- Polit, D., & Hungler, B., (1999), "Essentials of nursing research; methods and applications", J. B. Lippincott.
- Powell, A., Bagilhole, P. and Dainty, A. 2006 'the problem of women's assimilation into UK engineering cultures: can critical mass work', *Equal Opportunities International*, Vol. 25, No.8, PP. 688 – 699.
- Quick Take 2011 'Sex Discrimination and Sexual Harassment, [retrieved on 17/6/2012] at <<http://www.catalyst.org/publication/213/sex-discrimination-and-sexual-harassment>>.
- Rhoten, D and Pfirman,S. 2007 'Women in interdisciplinary science: Exploring preferences and consequences', *Research policy Journal*, Vol.36, PP.56-75.
- Sagebiel, F. 2003 'New initiatives in science and technology and mathematics at the formal level: masculinity cultures in engineering departments in organizations of higher education and perspectives for social change', GASAT 11 Gender, Science, Technology and Economic Paradigm Shift, 6-11 July.
- Sapsford, R., & V. Jupp, (1996), "Data Collection and Analysis. London: Sage Publications and the Open University Press.
- Sheridan, J. 1984 'Engineering Enrolments,' *Engineering Education*, Vol.75, No. 1, PP.45-49.
- Silicon Genetics, 2003 [retrieved on 6/9/2012] at [http://nebc.nerc.ac.uk/courses/GeneSpring/GS\\_Mar2006/1-way%20ANOVA.pdf](http://nebc.nerc.ac.uk/courses/GeneSpring/GS_Mar2006/1-way%20ANOVA.pdf).
- Singaravelu, H., White, L. and Bringaze, T. 2005 'Factors influencing International female students career choice', *Journal of Career Development*, Vol.32, No.1, PP.45-59.
- Sommerville, J., Kennedy, P. and Orr, L. 1993 'Women in the UK Construction Industry', *Journal of Construction Management and Economics*, Vol.11, PP.285-291.
- Sukovieff, H. 1989 'An investigation of influences on career decisions of 130 High school not workings: A follow-up study, [retrieved on 7/5/2012] at <[http://saskschoolboards.ca/research/female students/90-04.htm](http://saskschoolboards.ca/research/female%20students/90-04.htm)>.
- Taylor, C. 2010 'The Importance of Culture', [retrieved on 26/5/2012] at <<http://www.sygnacom.com/blog/20-the-importance-of-culture.html>>.
- Thompson, N. 1997 'Women in construction,' *Wise Net Journal*, Vol. 34, No. 43, PP.1-7.
- Van Oost, E. 1986 'Women in engineering education in the Netherlands', retrieved on 5/8/2012 at <<http://unesdoc.unesco.org/images/0008/000821/082144eo.pdf>>.
- Warren, D. 2003 'Construction fastest growing industry for women', *Charleston Regional Business Journal*, retrieved on 5.3.2012 at <[http://www.charlestonbusiness.com/issues/6\\_2/news/2755-1.html](http://www.charlestonbusiness.com/issues/6_2/news/2755-1.html)>.
- Wilkinson, S. 1996 'The factors affecting the career choice of male and Female civil engineering female students in the UK', *Career Development International*, Vol.1, No.5, PP.45-50.



- Wilson M. 1998 'Gendered career paths,' *Personnel review*, Vol. 27, No.5, PP. 398 – 411.
- Wood, G., & Haber, J., (1998), "Nursing research methods, critical appraisal and utilization", 4th ed., Mosby-Year Book.
- Young, D., Fraser, B. and Woolnough, B. 1997 'Factors affecting Female students career choice in science: An Australian study of rural and urban schools', *Research in Science Education*, Vol.27, No.2, PP. 195-214.
- Zar, J. (1999) *Biostatistical Analysis*. (4<sup>th</sup> ed.) Upper saddle river, NJ, Prentice Hall.

## **Appendix 1: The questionnaire (Arabic Version).**



العوامل التي تؤثر على اختيار المرأة لمهنتها: مقارنة بين الهندسة المدنية وغيرها من التخصصات الهندسية

## Factors Affecting Women Career Choice: Comparison between Construction Engineering and Other Engineering Disciplines

الاخت المهندسة الفاضلة..... بعد التحية

بداية اتقدم بجزيل الشكر و التقدير للمساهمة بجزء من وقتكم و جهدكم في تعبئة هذا الاستبيان.

ان هذا الاستبيان يهدف إلى دراسة العوامل التي تؤثر على اختيار المرأة لمهنتها :مقارنة بين الهندسة المدنية وغيرها من التخصصات الهندسية و هو جزء من البحث التكميلي لنيل درجة الماجستير في إدارة المشاريع الهندسية من الجامعة الإسلامية بغزة .

لذا يرجى منك الإجابة عن فقرات الاستبانة المرفقة شاكرة لكم تعاونكم، ومؤكدة لكم بأن المعلومات التي ستقدمها لا تستخدم إلا لأغراض البحث العلمي فقط.

الفئة المستهدفة: طالبات كلية الهندسة ، المهندسات العاملات، الشركات الهندسية

الباحثة

أماني حمدي محمدين

تحت إشراف

الأستاذ الدكتور / عدنان انشاصي

٢٠١٢

١. حالة المهندسة:

اعمل  خريج "لا يعمل"  طالبة

٢. إذا كنت تعملين ما هو القطاع الذي تعملين فيه:

حكومي  مؤسسة خاص  مؤسسة دولية  مؤسسة اهلية

٣. إذا كنت تعملين كم عدد سنوات الخبرة :

أقل من ٥ سنوات  من (٦-١٠) سنوات  من (١١-١٥) سنة  أكثر من ١٥ سنة

٤. التخصص:

مدني  معماري  كهرباء (اتصالات و تحكم)  حاسوب  صناعي

٥. ما مدي موافقتك على كل عبارة من العبارات التالية؟

الرقم	العبارة	درجة الموافقة				
		لا	لا	م	او	اوافق
<b>١. تأثير الوالدين و الأسرة</b>						
١,١	ان للوالدين تأثير كبير في اختيار التخصص في الهندسة.					
١,٢	إن للاصدقاء تأثير كبير في اختيار التخصص في الهندسة.					
١,٣	احد افراد الاسرة له تأثير كبير في اختيار التخصص في الهندسة.					
١,٤	مهنة الوالدين لها تأثير كبير في اختيار التخصص في الهندسة.					
١,٥	مستوى تعلم الوالدين له تأثير كبير في اختيار التخصص في الهندسة.					
١,٦	درست الهندسة لرغبة في العمل في مجال عمل الاسرة.					
<b>٢. تأثير هيمنة الرجال على مهنة الهندسة</b>						
٢,١	هيمنة الرجال على بعض تخصصات الهندسة يمنع النساء من اختيار الهندسة.					
٢,٢	هيمنة الرجال على المناصب الادارية العلنا يؤثر على اختيار المرأة لتخصص الهندسة.					
٢,٣	تفضيل الرجل على المرأة عند التوظيف يؤثر على اختيارها لتخصص الهندسة.					
٢,٤	صعوبة حصول المرأة على مركز أشرافي يؤثر على اختيارها لتخصص الهندسة.					
٢,٥	زيادة عدد النساء في مجال الهندسة يساهم في تحسين أداء العمل.					
٢,٦	قلة النساء العاملات في الهندسة تساهم في نقص المهارات في المهنة.					
<b>٣. تأثير الثقافة</b>						
٣,١	العادات و التقاليد تلعب دورا رئيسيا في اتخاذ قرار التخصص في الهندسة.					
٣,٢	الدور التاريخي الذي لعبه كل من المرأة و الرجل في المجتمع تجعل الرجل أقل تقبلا لزملائهم المهندسات.					
٣,٣	النساء اللاتي يتطلعن لأنجاب عدد كبير من الاطفال اكثر انجذابا الي القطاعات الاخرى من الهندسة.					
٣,٤	نظرة المجتمع الي المرأة انها زوجة فقط يجعلها أقل عرضة لأختيار مهنة الهندسة.					
٣,٥	تدين المرأة يلعب دورا رئيسيا في اتخاذ القرارات المهنية للمرأة.					
٣,٦	من خبرتي، أعتقد ان الدور التقليدي للمرأة كزوجة و ام يؤثر على تقبلها العمل في الميدان.					
٣,٧	العادات و التقاليد في مجتمعي يؤثر على تصرفاتي في ميدان العمل.					
٣,٨	عدم القدرة على الموازنة بين متطلبات العمل و الاسرة سبب رئيسي في عزوف الكثير من النساء عن العمل					
٣,٩	قلة عدد النساء العاملات في مجتمعنا ادي الي قلة عدد و عدم كفاءة دور رعاية الاطفال "الحضانة".					
١٠	هناك من يؤمن بمقولة ( نحن نقدر المرأة لكن لا نعطيها مكان ) .					
١١	البيئة المحيطة و الثقافة المجتمعية السائدة تؤثر في عمل المرأة في مجال الهندسة.					
<b>٤. تأثير التمييز ضد المرأة</b>						

الرقم	العبارة	درجة الموافقة				
		لا	لا	م	او	اواف
٤,١	التمييز يعكس صورة سلبية عند اختيار المرأة ل عملها.					
٤,٢	تعاني المرأة من التمييز عند عملها في الهندسة.					
٤,٣	يتم تقدير المرأة في تخصص الهندسة.					
٤,٤	المرأة العاملة في مجال الهندسة ليس لديها فرصة تطوير نفسها مثل زملائها الرجال.					
٤,٥	المرأة في موقع العمل لها احترامها كما الرجل.					
٤,٦	حقيقة أن الرجل أكثر خبرة من المرأة في مجال الهندسة.					
٤,٧	المرأة تناسبها الأعمال الإدارية أكثر من الأعمال في المواقع.					
٤,٨	الرجل يستطيع أن يعمل كل شيء وكذلك الحال بالنسبة للمرأة.					
٤,٩	المهندسات الحوامل اللاتي يعملن في موقع العمل يشهدنا أعلى نسبة تمييز مقارنة بقطاعات العمل الأخرى.					
١٠	يعود التمييز الذكوري ضد النساء لاعتقادهم أن دور المرأة يقتصر على البيت وتربية الأبناء.					
١١	تعرضت للتمييز في عملي لكوني امرأة.					
١٢	تتعرض المهندسات للمعاكسات والمضايقات اللفظية في عملها.					
١٣	تسود فكرة أن المهندسة بتركها العمل في مجال الهندسة فإن ذلك سيقضي على بطالة الرجال.					
١٤	الرغبة في رفع المستوى المعيشي لأسرتي سبب رئيسي في خروجي للعمل					
<b>٥. تأثير بيئة العمل و ساعات العمل</b>						
٥,١	بعض الامور التي تتعلق بطبيعة المرأة غير ملائمة للعمل في مجال الهندسة.					
٥,٢	بعض المواد والأدوات المستخدمة في الهندسة تمثل مشكلة لدي المهندسات.					
٥,٣	مرافق الخدمات غير كافية مثل دورات المياه و الوضوء و مكان الصلاة.					
٥,٤	طبيعة العمل في الهندسة تعزز وجود المرأة.					
٥,٥	النساء اقل تقبلا لعمل في بيئة غير آمنة من الرجل.					
٥,٦	فرصة حصول المرأة على مركز إشرافي في مكان العمل غير منصف.					
٥,٧	النساء اقل استعدادا للعمل في درجات الحرارة المرتفعة.					
٥,٨	التنقل بين مواقع العمل غير مناسب للمهندسة.					
٥,٩	معدات الحماية الشخصية غير مناسبة للمهندسة.					
١٠	بيئة العمل القاسية غير ملائمة لعمل المهندسة.					
١١	ساعات العمل الطويلة و عدم انتظامها تؤثر على اختيار مهنة الهندسة.					
١٢	العمل المسائي غير ملائم للمرأة.					
١٤	عدم انتظام أيام العمل غير ملائم للمرأة.					
١٥	قلة عدد ايام الإجازة تؤثر على إختيار الهندسة كمهنة.					
<b>٦. تأثير مقدرة المرأة الذهنية و الجسدية على العمل في مجال الهندسة</b>						
٦,١	المرأة التي تجاوزت الأربعين عاما غير ملائمة للعمل في تخصص الهندسة مثل الرجل في نفس السن.					
٦,٢	طبيعة المرأة الجسدية غير ملائمة لتخصص الهندسة مثل الرجل.					
٦,٣	المرأة أكثر تعقبا عن العمل من الرجل.					
<b>٧. تأثير المسؤولية الأسرية</b>						
٧,١	المرأة التي لديها أطفال صغار لا تستطيع العمل في الميدان.					
٧,٢	تكثر الاجازات لدي المرأة المتزوجة و لديها أطفال صغار.					
٧,٣	يقل تركيز المرأة و إنتاجيتها في العمل عندما تكون متزوجة و لديها أطفال.					
٧,٤	قلة وجود مرافق مجهزة لرعاية الاطفال في مجتمعنا يؤثر سلبا على إختيار المرأة مهنة الهندسة.					
٧,٥	ارتفاع أسعار المرافق المخصصة للأطفال يؤثر على خروج المهندسة للعمل.					
٧,٦	عمل المرأة في الهندسة يؤثر سلبا على الاستقرار الأسري.					
<b>٨. تفضيل المرأة للمهن الأخرى عن الهندسة</b>						
٨,١	تفضل المرأة الوظائف في قطاعات مثل التدريس ، التجارة أكثر من تخصص الهندسة.					
٨,٢	ان تكون المرأة محاسبه، قانونيه أو طبيبه أكثر جاذبية و شعبية للنساء من أن تكون مهندسة.					
٨,٣	أود ان اشجع النساء الأخرى على اختيار قطاعات مهنية أخرى غير الهندسة.					
<b>٩. تأثير فرص العمل و احتياجات المجتمع</b>						

الرقم	العبارة	درجة الموافقة				
		لا	لا	م	او	اواف
٩,١	توفر فرص عمل في مجال الهندسة أثر على في اختيار مهنة الهندسة.					
٩,٢	عدد قليل من المهندسات يجدن فرص عمل جيدة.					
٩,٣	تفضيل الرجل عن المرأة للعمل في الميدان أثر على اختيار مهنة الهندسة.					
٩,٤	عدم توفر فرص عمل مستقبلا سيدفعني لدراسة تخصص آخر غير الهندسة.					
<b>١٠. تأثير المعرفة السابقة لتخصصات الهندسة</b>						
١٠,١	كنت على اطلاع بالفرص المتاحة للوظيفة في تخصصات الهندسة.					
١٠,٢	المرأة تتوقع أن يكون لها مستقبل مهني ناجح في مجال الهندسة لأن لديها ما يكفي من المعرفة.					
١٠,٣	هناك حاجة لزيادة معرفة فرص العمل المتاحة للمهندسات.					
١٠,٤	المساواة بين الرجل والمرأة في الحصول على وظيفة يزيد من شعبية تخصص الهندسة.					
<b>١١. تأثير الحصول على معدل مرتفع في الثانوية العامة</b>						
١١,١	اقتصر أختياري لمهنة الهندسة على المعدل المرتفع في الثانوية العامة.					
<b>١٢. تأثير القيمة الاجتماعية</b>						
١٢,١	المستوي الاجتماعي للهندسة دفعني لدراستها.					
١٢,٢	البرستيج الخاص بالهندسة هو ما دفعني لدراسة الهندسة.					
١٢,٣	حلمي ان اكون مهندسة هو ما دفعني لدراسة الهندسة.					
<b>١٣. تأثير تكلفة الدراسة</b>						
١٣,١	المستوي المالي لاسرتي كان الدافع وراء دراسة الهندسة.					
١٣,٢	توفر المنح والقروض الجامعية أثر على أختياري لدراسة الهندسة.					
١٣,٣	ارتفاع تكلفة دراسة الهندسة أثر على أختياري لدراسة الهندسة.					
<b>١٤. تأثير دور المرأة والصورة النمطية للهندسة</b>						
١٤,١	يمكن للمرأة ان تبني مستقبل مهني ناجح في الهندسة.					
١٤,٢	للمرأة دور فعال في العمل الهندسي.					
١٤,٣	الرجل أكثر ملائمة لتخصصات الهندسة من المرأة.					
١٤,٤	يمكن للمرأة أن تساهم و تضيف جديد إلى الهندسة من خلال علمها.					
<b>١٥. إذا كنت تعلمين أجيبى عن التالي</b>						
		لا	نعم			
٥,١	هل تتقاضين نفس قيمة الراتب.					
٥,٢	هل تحصلين على فرصة مكافئة كالمهندس عند الحصول على ترقية.					
٥,٣	هل لديك نفس الفرصة الوصول الي مستويات ادارية علنا كالمهندس.					
٥,٤	هل تحصلين على نفس حوافز العمل.					

٦. إلى أي مدى كل من العناصر التالية أثرت على تعزيز قرار اختيار تخصصك في مهنة الهندسة.

الرقم	التأثير	منخفض	متوسط	عالية
٦,١	الخلفية الثقافية للمجتمع.			
٦,٢	المعرفة في مجال تخصصك في الهندسة.			
٦,٣	التشجيع من النساء اللاتي لديهن حياة مهنية ناجحة في مجال الهندسة.			
٦,٤	الإقناع من قبل الآباء والأصدقاء لدخول مجال الهندسة.			
٦,٥	الفضول لإستكشاف هذه المهنة.			
٦,٦	التوقعات المهنية.			
٦,٧	الأجر المرتفع و الأفق المالي.			
٦,٨	التحديات في بيئة العمل.			
٦,٩	المعدل المرتفع في الثانوية.			

الرقم	التأثير	منخفض	متوسط	عالية
٦,١٠	البرسنتيج الخاص بتخصص الهندسة.			
٦,١١	المكانة الاجتماعية لمهنة الهندسة.			
٦,١٢	ارتفاع تكلفة دراسة الهندسة.			
٦,١٣	صعوبة الدراسة بكلية الهندسة.			
٦,١٤	هيمنة الرجال على تخصص الهندسة.			
٦,١٥	التفوق في الرياضيات و الفيزياء.			

٧. دراسة العلاقة بين الثقافة السائدة وأختيار المهنة والنجاح في الحياة المهنية

الرقم	السؤال	نعم	لا	غير متأكد
٧,١	هل تعتقد ان العادات و التقاليد تؤثر على نجاح حياتك المهنية في تخصص الهندسة؟			
٧,٢	هل تعتقد أن الاختلاف الثقافي بين الذكور والإناث يؤثر على اختيارهم مهنة الهندسة؟			
٧,٣	إذا كان الجواب نعم، هل تعتقد أن هذا التأثير يساهم في انخفاض وجود المرأة في الهندسة؟			
٧,٤	إذا كان الجواب نعم، هل تعتقد أن هذا يساهم في إنتشار التمييز ضد المرأة التي دره			

٨. إلى اي مدى ما يلي يؤثر على إختيار المهن الأخرى دون الهندسة؟

الرقم	التأثير	منخفض	متوسطة	عالية
٨,١	الصورة الذكورية و غير الجاذبة لبعض تخصصات الهندسة.			
٨,٢	المعرفة المسبقة لتخصص الهندسة.			
٨,٣	الهيمنة الذكورية على بعض تخصصات الهندسة.			
٨,٤	الطبيعة القاسية لبعض تخصصات الهندسة و التحدي الموجود في مكان العمل.			
٨,٥	التوقعات الوظيفية.			
٨,٦	التوقعات المالية .			
٨,٧	البيئة التمييزية في اماكن العمل.			

٩. هل تعتقد أن إختيارك لمهنة الهندسة كان قرار صائب و جيد؟

نعم  لا  غير متأكد

١٠. دخولك مجال الهندسة كان بناءً على رغبة مسبقة؟

نعم  لا  غير متأكد

١١. هل تشعرين أن درجة الجامعة في الهندسة تؤهلك ( تقنياً - نفسياً - اجتماعياً ) لدخول مجال العمل؟

نعم  لا  غير متأكد

١٢. اذا كنت تعملين هل تشعرين بالرضا عن عملك كمهندسة ؟

نعم  لا  غير متأكد

١٣. في عملك كمهندسة هل تتوافق أهدافك الخاصة مع أهداف العمل ؟

نعم  لا  غير متأكد

١٤. سوف أشجع مهندسات ناشئات للدخول في مجال الهندسة ؟

نعم  لا  غير متأكد

١٥. العدد القليل للموظفات في بعض التخصصات الهندسية يعود لعدم الكفاءة وقلة المهارة .

نعم  لا  غير متأكد

١٦. إذا كان الجواب نعم، هل تعتقد أن انخفاض عدد النساء في اختيار الوظائف في مجال الهندسة يسهم في تحقيق هذا؟

نعم  لا  غير متأكد

١٧. هل تعتقد أن الوظائف في مجال الهندسة لها شعبية أقل للمرأة من التخصص في القطاعات الأخرى؟

نعم  لا  غير متأكد

١٨. كانت معرفتي بمهنة الهندسة قبل أختياري لتخصصي معرفة

قليلة  متوسطة  كبيرة

١٩. أكتسبت هذه المعرفة من

الانترنت  المدرسة  الأسرة  أخرى

٢٠. أي مجال من تخصصات الهندسة تجدونها أكثر جاذبية و شعبية لدى المرأة.

مدني  معماري  كهرباء (اتصالات و تحكم)  حاسوب  صناعي

٢١. عدم حصولي على فرصة عمل بعد التخرج سيدفعني لدراسة تخصص آخر مثل الرياضيات أو الفيزياء

نعم  لا  غير متأكد

٢٢. ما الذي يحفزك لأكمال دراستك؟

.....  
.....

٢٣. ما هي العوامل التي أثرت عليك في اختيار تخصص في الهندسة؟

.....  
.....

٢٤. أي مجال من تخصصات الهندسة تجدها أكثر ملائمة للمرأة من التخصصات الهندسية الأخرى؟

.....  
.....



٢٥. كيف تؤثر هيمنة الرجال على تخصص الهندسة في أختيار المرأة؟

.....  
.....

٢٦. ما هي نظرة عائلتك و مجتمعك لنساء اللاتي يعملن في مواقع العمل التي يهيمن عليها الرجال؟

.....  
.....

٢٧. ما الذي سيحدث لو لم تقم بأختيار مهنة الهندسة؟

.....  
.....

٢٨. ماذا ستفعلن لو لم تحصل على فرصة عمل؟

.....  
.....

٢٩. مقترحات وتوصيات يمكن أن تسهم في ازدهار عمل المرأة ( كمهندسة ) وتطوره من وجهة نظرك .

.....  
.....

## الاستبيان الخاص بأصحاب الشركات

١. مجال عمل الشركة:
- المقاولات  الأستشارات الهندسية  الاتصالات و الانترنت  الكهرباء
٢. عدد سنوات خبرة المؤسسة
- أقل من ٥ سنوات  من (٥-١٠) سنوات  من (١١-١٥) سنة  أكثر من ١٥ سنة
٣. عدد الموظفين في الشركة
- أقل من ١٠  من (١١-٢٠)  من (٢١-٣٠)  أكثر من ٣٠
٤. كم عدد الموظفين لدي شركتكم
- أقل من ٥  من (٦-١٠)  من (١١-١٥)  أكثر من ١٥
٥. هل الموظفة لديكم تعمل فعلا في مجال الهندسة؟
- نعم  لا  غير متأكد
٦. هل تحصل المهندسات على نفس معدل الاجور التي يحصل عندها نظرائهم من المهندسين؟
- نعم  لا  غير متأكد
٧. هل فرصة حصول المهندسة على وظيفة مساوية للمهندس في العمل المكتبي؟
- نعم  لا  غير متأكد
٨. هل فرصة حصول المهندسة على وظيفة مساوية للمهندس في العمل الميداني؟
- نعم  لا  غير متأكد
٩. هل يتم توفير مرافق منفصلة للموظفات مثل دورات المياه و الوضوء؟
- نعم  لا  غير متأكد
١٠. هل لدي ادارة الشركة سياسة و اضحة صريحة في عدم التمييز عند التوظيف و التدريب و جمع المعلومات على اساس الجنس؟
- نعم  لا  لا أعلم
١١. هل شركتكم تمنح المهندسة فرصة للحصول على ترقية داخل هيكلية الشركة؟
- نعم  لا  لا أعلم
١٢. هل تعمل شركتكم على دعم و الحصول على تمويل بهدف تحسين وضع و مهارات المهندسات العاملات لديكم؟
- نعم  لا  لا أعلم

## **Appendix 2: The questionnaire (English Version).**



The Islamic University  
Faculty of Engineering  
Deanery of Graduate Studies

الجامعة الإسلامية - غزة  
كلية الهندسة  
عمادة الدراسات العليا

## Factors Affecting Women Career Choice: Comparison between Construction Engineering and Other Engineering Disciplines

**Dear Sir,**

Beginning I like to extend my sincere thanks and appreciation to contribute a portion of your time and effort in filling out this questionnaire. This questioner aims to study Factors Affecting Women Career Choice: Comparison between Construction Engineering and Other Engineering Disciplines.

This is part of partial fulfillment of the requirements for master degree of science in engineering project management from the Islamic University-Gaza .

So please answer questions of the questionnaire attached thankful to you for your cooperation, and confirmed that the information you will provided will be used only for research purposes only.

**Target group:** engineering female students, working women and company in different engineering discipline.

### **Content of questionnaire:**

This questionnaire is divided into two sections to accomplish the aim which was put for:-

**Section (1):** general information.

**Section (2):** Factors affecting women career choice.

**Researcher**

**Amany H. Mohammaden**

**Supervisor**

**Prof. Dr. Adnan Enshassi**

2012

## Section One: General Information

### 1. Situation of engineering women

Work       Not working "Not work"       Female students

### 2. If you are working, what is the sector you are working in?

Governmental organization       international organization       Privet organization       civil

### 3. If you are working, how many your years' experience you are having?

Less than 5 years       (5-10) years       (11-15) years       More than 15 years

### 4. Discipline:

Civil       Architect       Communication       Computer       Industry

### 5. To what extent do you agreed with each of the following statements?

No.	Statements	Degree agreement				
		Strongly	Disagreed	Neutral	Agreed	Strongly
<b>1. Factors related to parents, family and friends</b>						
1.1	my parents have a significant effect in the choice of specialization in engineering					
1.2	my Friends have significant effect in the choice of specialization in engineering					
1.3	One of my family member has a significant effect in the choice of specialization in engineering					
1.4	The profession of my parents have a significant impact on the choice of specialization in engineering					
1.5	Level of education of my parents has a significant effect in the choice of specialization in engineering					
1.6	I studied engineering in order to work in the field of family business.					
<b>2. Factors related to masculinity and feminization of engineering.</b>						
2.1	Male dominance on some engineering disciplines prevents women from choosing engineering.					
2.2	Male dominance on the senior administrative positions affect women's choice of profession in engineering.					
2.3	Preference for men over women when hiring affect the choice of profession in engineering.					
2.4	Difficult to get women to the supervisory position affect the choice of profession in engineering.					
2.5	Increase the number of women in engineering contributes in improving the performance of work.					
2.6	Low number of women in engineering contributes to the shortage of skills in the profession.					
<b>3. Factors related to the culture effect</b>						
3.1	Customs and tradition play a major role in the decision to specialize in engineering.					
3.2	The historical role played by women and men in society mak men less receptive to their women colleagues.					

No.	Statements	Degree agreement				
		Strongly	Disagreed	Neutral	Agreed	Strongly
3.3	Women wish to have a large number of children are more attracted to other sectors of the engineering					
3.4	Society's perception of women throughout the wife only make it less likely for the selection of the engineering profession.					
3.5	Condemns women play a key role in the decision-making for women's working .					
3.6	From my experience, I think that the traditional role of women as wives and mother affect the accepted work in					
3.7	Customs and traditions in a community affect my actions in the field of employment.					
3.8	Inability to balance between the demands of work and family is a major cause in the reluctance of many women					
3.9	The small number of working women in our society has led to fewer and inefficient kindergarten "nursery".					
3.10	There are those who believe in the proverb (We appreciate women but do not give them a place).					
3.11	The surrounding environment and the prevailing societal culture affecting the work of women in the field of					
<b>4. Factors related to sex discrimination and harassment on site</b>						
4.1	Discrimination reflect negative image when women choice her career.					
4.2	Engineering women subjected to harassment in the workplace					
4.3	Estimated women majoring in engineering.					
4.4	Working women in the field of engineering does not have the opportunity to develop the same as her male					
4.5	Women in the workplace are respected as a man.					
4.6	Man has experienced more than women in engineering fields.					
4.7	Women fit administrative work more than work at the sites.					
4.8	The man can do everything as well as for women.					
4.9	Pregnant engineering women who work in the workplace discrimination suffered the highest percentage compared					
4.10	Male discrimination against women refer to their belief that the role of women confined to the home and raising					
4.11	I have discriminated in my work because I am women.					
4.12	Engineers subjected to verbal flirting and harassment at work.					
4.13	Prevail engineered the idea that leaving them to work in the field of engineering, it will eliminate the male					
4.14	The desire to raise the standard of living for my family a major reason for my departure to work					
<b>5. Factors related to work environment and work hours.</b>						
5.1	Some things are related to the nature of women not suitable for work in the field of engineering.					
5.2	Some materials and tools used in engineering make a problem for women.					
5.3	Inadequate service facilities such as toilets , ablution and place of prayer					
5.4	The nature of the work in engineering fields promotes the presence of women.					

No.	Statements	Degree agreement				
		Strongly	Disagreed	Neutral	Agreed	Strongly
5.5	Women less receptive to work in an unsafe environment than men.					
5.6	Chance of women to get supervisory position in the workplace is unfair					
5.7	Women are less likely to work in high temperatures weather.					
5.8	Travels between work sites are not suitable for women.					
5.9	Personal protective equipment is not suitable for women.					
5.10	Harsh working environment is not suitable for working women					
5.11	Long working hours effect on women to the choice profession in engineering.					
5.12	Evening work is not appropriate for women					
5.13	Irregular working hours is not appropriate for women					
5.14	Irregular working days is not appropriate for women					
5.15	Limited number of leave days affect the choice of engineering as a profession for women					
<b>6. Factors related to intellectual and physical capability</b>						
6.1	Women over fourteen years old are not appropriate for work in your field as men in the same age.					
6.2	Women physically unsuited to allocate engineering as men.					
6.3	Women take more vacation than men.					
<b>7. Factors related to family responsibility.</b>						
7.1	Women with young children cannot work at the site.					
7.2	Vacations abound with a married woman and have young children.					
7.3	A low concentration of women and their productivity at work when they are married and have children.					
7.4	Lack of facilities equipped to care for children in our society affect women to choose engineering profession.					
7.5	High prices facilities special for children affect women to choose engineering profession.					
7.6	Women working in engineering adversely affect family stability					
<b>8. Factors related to preference profession</b>						
8.1	Women prefer jobs in sectors such as teaching, trade more than engineering specialty.					
8.2	accounting, legal or doctor more attractive and popular for women of being an engineer					
8.3	I would encourage other women to choose working sectors other than engineering.					
<b>9. Factors related to job opportunities and societal need.</b>						
9.1	Provide job opportunities in the field of engineering impact on the selected engineering discipline.					
9.2	Few women find a good jobs					
9.3	Men's preference than women to work effect on the selection the engineering profession.					

No.	Statements	Degree agreement				
		Strongly	Disagreed	Neutral	Agreed	Strongly
9.4	Lack of job opportunities in the future leads me to study another profession.					
<b>10. Factors related to the impact of prior knowledge of engineering disciplines</b>						
10.1	Women familiar with the opportunities available for the job engineering disciplines.					
10.2	Women expect to have a successful career in engineering because they have enough knowledge					
10.3	There is a need for engineering disciplines to provide more knowledge about the opportunity to employ women.					
10.4	Equality between men and women in obtaining and function increases the popularity of specialty engineering.					
<b>11. Factors related to obtain high rate in high school.</b>						
11.1	Confined my optional for the engineering profession on obtain high average in high school.					
<b>12. Factors related to prestige of engineering career.</b>						
12.1	Social level of engineering leads me to choice this profession.					
12.2	Prestige of engineering career leads me to choice this profession					
12.3	My dream to be engineering leads me to choice this profession					
<b>13. Factors related to cost of course.</b>						
13.1	Financially level of my family leads me to study engineering.					
13.2	Provide grants and university loans impact on my choice of Engineering.					
13.3	The high cost of engineering study impact on my decision to choice Engineering.					
<b>14. Factors related to the historical role of women.</b>						
14.1	Women can build a successful career in engineering.					
14.2	Women's have active role in the engineering work.					
14.3	A man more suited than women's for disciplines of engineering					
14.4	Women can contribute and add new in engineering through her work.					
<b>15. If you work answer the next</b>						
		<b>Yes</b>		<b>No</b>		
15.1	Do you take the same salary value?					
15.2	Do you get the same chance as men engineer when you get promotion.					
15.3	Do you have the same chance as men engineer when you take high administrative position?					
15.4	Do you get the same incentive as men engineer?					

6. What extent each of the following influenced your decision to further your career in engineering?

No.	Influence	low	medium	high
6.1	Cultural Background.			
6.2	Knowledge of the construction industry.			
6.3	Encouraged by the knowledge of women who have had successful careers in			



6.4	Convinced by your parents.			
6.5	Exploration of the unknown.			
6.6	Career expectations.			
6.7	Financial prospects.			
6.8	Challenging work environment.			
6.9	High rate in high school.			
6.10	Engineering prestige.			
6.11	High social value of engineer.			
6.12	High cost of engineering study.			
6.13	Difficult study of engineering college.			
6.14	Male dominance of engineering profession.			
6.15	Interest in mathematics and physics			

7. Study of the relationship between culture and choice of profession and career success.

No.	Question	Yes	No	Unsure
7.1	Do you think that your Customs and traditions affect the success of your career in your fi			
7.2	Do you think that the cultural difference between males and females affect the choice of t			
7.3	If the answer is <b>yes</b> , do you think that this effect contributes to the low presence of wome			
7.4	If the answer is <b>yes</b> , do you think that this contributes to the spread of discrimination agai Women, which entered in the field of engineering?			

8. How much the following influences the choice of other sectors over engineering sector?

No.	Influence	Yes	No	Unsure
8.1	The masculine and unattractive image of engineering profession			
8.2	Knowledge of the engineering profession			
8.3	Male dominance of engineering profession.			
8.4	The seemingly discriminatory environment of engineering profession.			
8.5	Career expectations.			
8.6	Financial prospects.			
8.7	Discrimination in site.			

9. Do you think that your choice of career was a right decision?

Yes  No  Unsure

10. Choosing field of engineering was based on the desire to advance?

Yes  No  Unsure

11. Do you feel that a university degree in engineering qualifies (technically - psychologically - socially) to enter the field of work?

Yes  No  Unsure

12. If you work, do you satisfaction about your work in engineering?

Yes  No  Unsure

13. In your work as an engineer you meet your goals with business goals?

Yes  No  Unsure

14. I will encourage junior engineers to enter in the field of engineering?

Yes  No  Unsure

15. Small number of women employees in some engineering disciplines due to the inefficiency and lack of skill

Yes  No  Unsure

16. If the answer is yes, do you think that the low number of women to choose jobs in engineering contributes to this?

Yes  No  Unsure

17. Do you think that jobs in the field of engineering are less popular for women to specialize in other sectors?

Yes  No  Unsure

18. My knowledge of the engineering profession before choice engineering profession, knowledge

Low  medium  great

19. How did you acquire this knowledge?

Internet  school  family  other

20. Any area of discipline of engineering found that more attractive to the women.

Civil  Architect  Communication  Computer  Industry

21. If I don't get an opportunity to work as engineer I will study another field as mathematics or physics?

Yes  No  Unsure

22. What influenced your decision to study towards a career in engineering?

\_\_\_\_\_  
\_\_\_\_\_

23. How much dominance effect on women choice on her career in engineering disciplines?

\_\_\_\_\_  
\_\_\_\_\_

24. What is the look of your family and your community for women who work in workplaces dominated by men?

\_\_\_\_\_  
\_\_\_\_\_

25. What would you do if you don't get job?

\_\_\_\_\_  
\_\_\_\_\_

26. Proposals and recommendations that could contribute to the prosperity of women's work (as an engineer) and its evolution from your point of view.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Company

1. Company field

Contracting  Consulting engineering  Internet communications  Designing Electricity

2. Years of Experience:

Less than 5 years  (5-10) years  (11-15) years  More than 15 years

3. Number of employees in the company

Less than 10  (11-20)  (21-30)  More than 30

4. How many women employed in your company?

Less than 5  (6-10)  (11-15)  More than 15

5. Are employed engineer actually works in the field of engineering?

Yes  No  Unsure

6. Do engineering women take the same rate of salary as men counterparts?

Yes  No  Unsure

7. Are engineering women have a chance to get a job equal to men engineer in the office work?

Yes  No  Unsure

8. Are engineering women have a chance to get a job equal to men engineer in the site work?

Yes  No  Unsure

9. Are provide separate facilities for women employees such as toilets and ablution?

Yes  No  Unsure

10. Does your company's management have clear and explicit policy in the non-discrimination when hiring, training and gathering information on the basis of sex?

Yes  No  Unsure

11. Is your company gives women a chance to get promoted within the structure of the company?

Yes  No  Unsure

12. Do you work to get finance support in order to improve the status and skills of women working for you?

Yes  No  Unsure

## Appendix 3: Questionnaire validity

## Criterion Related Validity

### 1) Internal consistency:

Internal consistency of the questionnaire is measured by a scouting sample, which consisted of **thirty** questionnaires, through measuring the correlation coefficients between each paragraph in one field and the whole field. Tables No.'s (1-14) below show the correlation coefficient and p-value for each field items. As show in the table the p- Values are less than 0.05 or 0.01,so the correlation coefficients of this field are significant at  $\alpha = 0.01$  or  $\alpha = 0.05$ , so it can be said that the paragraphs of this field are consistent and valid to be measure what it was set for.

**Table (1) the correlation coefficient between each paragraph in the field and the whole field  
First: The ability of women to work in the field of engineering**

Num ber	Statement	Pearson coefficient	p-value
1	A low concentration of women and their productivity at work when they are	0.580	0.001
2	Vacations abound with a married woman and have young children.	0.547	0.002
3	Women with young children cannot work at the site.	0.505	0.004
4	High prices facilities special for children affect women to choose engineering	0.646	0.000
5	Women working in engineering adversely affect family stability.	0.611	0.000
6	Lack of facilities equipped to care for children in our society affect women to	0.373	0.042
7	Some materials and tools used in engineering make a problem for women.	0.385	0.036
8	Inability to balance between the demands of work and family is a major cause in	0.644	0.000
9	Women take more vacation than men.	0.577	0.001
10	Women prefer jobs in sectors such as teaching, trade more than engineering	0.564	0.001
11	Prevail engineered the idea that leaving them to work in the field of	0.710	0.000
12	Women physically unsuited to allocate engineering as men.	0.670	0.000

**Table (2) the correlation coefficient between each paragraph in the field and the whole field  
Second: The personal qualities of an engineer**

		Pearson	p-value
1	Preference for men over women when hiring affect the choice of profession in	0.496	0.005
2	Male dominance on the senior administrative positions affects women's choice	0.576	0.001
3	Male dominance on some engineering disciplines prevents women from	0.602	0.000
4	Difficult to get women to the supervisory position affect the choice of	0.375	0.041
5	Men's preference than women to work effect on the selection of the	0.647	0.000
6	Discrimination reflect negative image when women choice her career.	0.636	0.000
7	Estimated women majoring in engineering.	0.394	0.031
8	The surrounding environment and the prevailing societal culture affecting the	0.676	0.000
9	Engineering women subjected to harassment in the workplace	0.568	0.001
10	Society's perception of women throughout the wife only makes it less likely for	0.584	0.001
11	Few women find a good jobs	0.458	0.011

**Table (3) the correlation coefficient between each paragraph in the field and the whole field Third: Discrimination against Women**

Number		Pearson	p-value
1	Women can contribute and add new in engineering through her work.	0.472	0.008
2	Women expect to have a successful career in engineering because they have	0.522	0.003
3	Women can build a successful career in engineering.	0.550	0.002
4	Women's have active role in the engineering work.	0.524	0.003
5	There is a need for engineering disciplines to provide more knowledge about the	0.591	0.001
6	The small number of working women in our society has led to fewer and	0.508	0.004
7	Personal protective equipment is not suitable for women.	0.681	0.000

**Table (4) the correlation coefficient between each paragraph in the field and the whole field Forth: Family and parents**

Number		Pearson coefficient	p-value
1	Prestige of engineering career leads me to choice this profession.	0.642	0.000
2	Social level of engineering leads me to choice this profession.	0.714	0.000
3	Confined my optional for the engineering profession on obtain high average in	0.573	0.001
4	From my experience, I think that the traditional role of women as wives and	0.404	0.027
5	My dream to be engineering leads me to choice this profession.	0.596	0.001
6	Provide job opportunities in the field of engineering impact on the selected	0.442	0.014
7	Some things are related to the nature of women not suitable for work in the field	0.474	0.008
8	Customs and traditions in a community affect my actions in the field of	0.656	0.000
9	Women fit administrative work more than work at the sites.	0.418	0.022

**Table (5) the correlation coefficient between each paragraph in the field and the whole field Fifth: Male dominance on the engineering profession**

Number		Pearson coefficient	p-value
1	Women are less likely to work in high temperatures weather.	0.445	0.014
2	Long working hours effect on women to the choice profession in engineering.	0.521	0.003
3	Harsh working environment is not suitable for working women	0.404	0.027
4	Evening work is not appropriate for women	0.328	0.077
5	Irregular working days is not appropriate for women	0.566	0.001
6	Women less receptive to work in an unsafe environment than men.	0.497	0.005
7	Travels between work sites are not suitable for women.	0.426	0.019
8	Limited number of leave days affect the choice of engineering as a profession	0.625	0.000
9	The nature of the work in engineering fields promotes the presence of women.	0.244	0.194

**Table (6) the correlation coefficient between each paragraph in the field and the whole field sixth: Culture**

		Pearson coefficient	p-value
1	my parents have a significant effect in the choice of specialization in	0.426	0.019
2	One of my family member has a significant effect in the choice of	0.456	0.011
3	my Friends have significant effect in the choice of specialization in	0.568	0.001
4	Level of education of my parents has a significant effect in	0.412	0.024
5	The profession of my parents have a significant impact on the	0.669	0.000
6	Financially level of my family leads me to study engineering.	0.638	0.000
7	accounting, legal or doctor more attractive and popular for women of being	0.539	0.002
8	Women familiar with the opportunities available for the job in engineer	0.571	0.001
9	Man has experienced more than women in engineering fields.	0.393	0.032

**Table (7) the correlation coefficient between each paragraph in the field and the whole field seventh: Social value and prestige of engineer**

Z =		Pearson coefficient	p-value
1	Chance of women to get supervisory position in the workplace is unfair.	0.378	0.040
2	I have discriminated in my work because I am women.	0.618	0.000
3	Male discrimination against women refer to their belief that the role of women	0.499	0.005
4	Equality between men and women in obtaining and function increases the	0.419	0.021
5	Inadequate service facilities such as toilets , ablution and place of prayer	0.449	0.013
6	Pregnant engineering women who work in the workplace discrimination suffered	0.639	0.000
7	There are those who believe in the proverb (We appreciate women but do not give	0.388	0.034
8	The desire to raise the standard of living for my family a major reason for my	0.504	0.005
9	Women wish to have a large number of children are more attracted to other sectors	0.646	0.000

**Table (8) the correlation coefficient between each paragraph in the field and the whole field eighth: The role of women and the stereotypical image of Engineering**

		Pearson coefficient	p-value
1	Lack of job opportunities in the future leads me to study another profession.	0.397	0.030
2	A man more suited than women's for disciplines of engineering.	0.440	0.015
3	The high cost of engineering study impact on my decision to choice Engineering.	0.376	0.040
4	Women over fourteen years old are not appropriate for work in your field as men	0.435	0.016
5	The historical role played by women and men in society make men less receptive to	0.478	0.008
6	I would encourage other women to choose working sectors other than engineering.	0.432	0.017

**Table (9) the correlation coefficient between each paragraph in the field and the whole field ninth: Work environment and working hours**

Z =		Pearson coefficient	p-value
1	Women in the workplace are respected as a man.	0.458	0.011
2	Customs and tradition play a major role in the decision to specialize in engineering.	0.582	0.001
3	Engineers subjected to verbal flirting and harassment at work.	0.394	0.031
4	Provide grants and university loans impact on my choice of engineering.	0.406	0.026
5	Working women in the field of engineering does not have the opportunity to	0.623	0.000
6	The man can do everything as well as for women.	0.541	0.002

**Table (10) the correlation coefficient between each paragraph in the field and the whole field tenth: Women's preference for other professions**

		Pearson coefficient	p-value
1	Low number of women in engineering contributes to the shortage of skills in the	0.529	0.003
2	Condemns women play a key role in the decision-making for women's working.	0.477	0.008
3	Increase the number of women in engineering contributes in improving the performan	0.479	0.007
4	I studied engineering in order to work in the field of family business.	0.658	0.000