إقـــــرار

أنا الموقع أدناه مقدم الرسالة التي تحمل العنوان:

Critical Success Factors for Subcontractors Management in the Gaza Strip

" عوامل النجاح المهمة لإدارة المقاولين من الباطن في المشاريع الإنشائية في قطاع غزة"

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DECLARATION

The work provided in this thesis, unless otherwise referenced, is the researcher's own work, and has not been submitted elsewhere for any other degree or qualification

Student's name: **محمد حسن فارس شحادة** اسم الطالب:

Signature: التوقيع:

Date: 2015/05/06 التاريخ:

The Islamic University - Gaza
Higher Education Deanship
Faculty of Engineering
Department of Civil Engineering
Engineering Projects Management

الجامعة الإسلامية – غزة
عمادة الدراسات العليا
كلية الهندسة
قسم الهندسة المدنية
إدارة المشاريع الهندسية

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" عوامل النجاح المهمة لإدارة المقاولين من الباطن في المشاريع الإنشائية في قطاع غزة"

Prepared By:

Mohammed Hassan Shehada

Supervised by

Dr. Nabil I. El Sawalhi

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بسم الله الرحمن الرحيم

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نتيجة الحكم على أطروحة ماجستير

بناءً على موافقة شئون البحث العلمي والدراسات العليا بالجامعة الإسلامية بغزة على تشكيل لجنة الحكم على أطروحة الباحث/ **محمد حسن فارس شحادة** لنيل درجة الماجستير في كلية *الهندسة* قسم الهندسة المدنية- إدارة المشروعات الهندسية وموضوعها:

عوامل النجاح المهمة لإدارة المقاولين من الباطن في المشاريع الإنشائية في قطاع غزة

Critical success factors for subcontractors management in gaza strip

وبعد المناقشة التي تمت اليوم السبت 04 جمادى الآخر 1436هـ، الموافق 2015/04/11م الساعة العاشرة والنصف صباحاً، اجتمعت لجنة الحكم على الأطروحة والمكونة من:

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وبعد المداولة أوصت اللجنة بمنح الباحث درجة الماجستير في كلية *الهندسة*/ قسم الهندسة المدنية- إدارة المشروعات الهندسية.

واللجنة إذ تمنحه هذه الدرجة فإنها توصيه بتقوى الله ولزوم طاعته وأن يسخر علمه في خدمة دينه ووطنه.

والله ولي التوفيق،،،

مساعد نائب الرئيس للبحث العلمي وللدراسات العليا

أ.د. فؤاد علي العاجز

P.O. Box 108, Rimal, Gaza, Palestine fax: +970 (8) 286 0800 فاكس Tel: +970 (8) 286 0700 ص.ب. 108 الرمال، غزة، فلسطين هاتف
public@iugaza.edu.ps www.iugaza.edu.ps

بسم الله الرحمن الرحيم

((يرفع الله الذين أمنوا منكم والذين أوتوا العلم درجات))

صدق الله العظيم

سورة المجادلة (11)

DEDICATION

- *I would like to dedicate this modest work to my parents for their endless support*
- *To my wife for her unlimited encouragement*
- *To my children, my Brothers, sisters, colleagues and friends for their sustainable support*

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ABSTRACT

The construction industry is one of the main sectors of the Palestinian economy. It plays significant role in the economic development. This research has addressed an important but always neglected issue in the construction industry in the Gaza Strip, namely "the subcontractors' management in the construction project". Subcontracting is a common practice in the construction industry. On any particular project, general contractors may rely on many subcontractors to perform specific tasks such as construction works, electric works, mechanical works, roofing, steel erection and so on.

This research aims to improve the management of subcontractors in construction projects in the Gaza Strip. The aim of the study is achieved by specific objectives which are: identifying the success factors affecting the subcontractors' management in the construction project, find the barriers for the good performance of subcontractors in construction project and effect of subcontractors' management in saving the project cost and time.

A questionnaire survey was conducted and 83 factors were identified, categorized into 8 groups, evaluated and ranked from contractors and subcontractors perspectives. 135 questionnaires were distributed as follows: 90 to contractors and 45 to subcontractors. 113 questionnaires were received (83.7%) as follows: 81 (90%) from contractors and 32 (71%) from subcontractors.

The research revealed the important success factors affecting the subcontractors' management in the construction project in the Gaza Strip include: "Manager personality & his experience, financial ability & strength of the main contractors, government policy, market condition & political situation, quality and clarity of design drawing and shop drawings, practical and technical ability of the main contractors, qualified supervisory staff and the clarity of the contract between contractors and subcontractors"

The study found out that a good subcontractors' management in construction project effect on minimizing the overall cost and time of the project by minimizing the overhead percentage of the project, planned time for project construction, project labor cost and cost of variation orders.

The study recommended that the contractors should select the project manager who has a strong personality and a high experience in the construction industry, contractors should have a strong financial capacity to be able to issue the financial payments to the subcontractor on the due time. Moreover it is recommended that the drawing and specifications for the project must be clear to all members of the project.

And on other hand, Subcontractors are recommended to employ sufficient number of qualified technical staff with appropriate experience of the project and to prepare all required materials and equipment.

ملخص البحث

يعتبر قطاع الإنشاءات من القطاعات الأساسية في الاقتصاد الفلسطيني حيث انها تلعب دوراً هاما في التنمية الاقتصادية وقد تناول هذا البحث قضية مهمة ولكن مهملة دائما في قطاع الإنشاءات في قطاع غزة وهي "إدارة مقاولي الباطن في المشارع الهندسية".

إن التعاقد من الباطن هو ممارسة شائعة في قطاع الإنشاءات، حيث أنه في أي مشروع هندسي يعتمد المقاول الرئيسي علي المقاولين من الباطن لأداء مهام محددة مثل أعمال الطوبار، أعمال البناء، الأعمال الكهربائية، الأعمال الميكانيكية ....الخ.

تهدف هذه الدراسة الي تحسين إدارة المقاولين من الباطن في المشاريع الهندسية في قطاع غزة. ولقد تم تطبيق منهجية لهذه الدراسة من خلال استخدام الاستبانة والتي تم توزيعها علي شركات المقاولات ومقاولي الباطن. وقد تم توزيع الاستبانة علي مائة وخمسة وثلاثين عينة كالتالي: 90 من فئة المقاول الرئيسي، 45 من فئة المقاولي من الباطن. تم استقبال مائة وثلاثة عشر استبانة كالتالي: 81 من فئة المقاول الرئيسي، 32 من فئة المقاول من الباطن، وقد اشتملت الدراسة على عدة محاور هي:

1. عوامل النجاح التي تؤثر على إدارة المقاولين من الباطن "في مشروع البناء.
2. المعوقات التي تعيق الحصول علي الأداء الجيد من المقاولين الباطن في المشروع الهندسي.
3. تأثير إدارة المقاولين الباطن علي توفير التكلفة والوقت في المشروع الهندسي.

كشفت الدراسة عن العوامل الأكثر أهمية في التأثير علي إدارة المقاولين الباطن في المشاريع الانشائية في قطاع غزة والمتمثلة في " خبرة وشخصية مدير المشروع، القدرة والقوة المالية للمقاول الرئيسي، سياسة الحكومة، وحالة السوق والوضع السياسي، جودة ووضوح المخططات التصميمية والتشغيلية، القدرة العملية والتقنية للمقاول الرئيسي، خبرة طاقم الاشراف الموجود في الموقع، وضوح العقد المبرم بين المقاول الرئيسي والمقاول الفرعي".

أوضحت الدراسة أن إدارة المقاول الباطن في المشروع الهندسي يساعد في تقليل التكلفة والمدة المخصصين لأي مشروع من خلال تقليل نسبة المصاريف العامة والإدارية للمشروع، تقليل الوقت المخصص للنشاطات في المشروع، تقليل تكلفة العمالة الموجودة في الموقع اضافة الي تقليل تكلفة الأوامر التغيرية.

وقد خلصت الدراسة إلى عدة توصيات لتحسين إدارة مقاولي الباطن في المشاريع الهندسية في قطاع غزة، علي سبيل المثال : يجب علي المقاول الرئيسي اختيار مدير المشروع ذو الخبرة العالية والشخصية القوية في الموقع، اضافة الي انه يجب اختيار المقاول الرئيسي صاحب القوة المالية القادرة علي اصدار دفعات مالية للمقاولين من الباطن عند تأخر دفعات المالك، كما ويوصي أيضاً بأن تكون المخططات والمواصفات الخاصة بالمشروع واضحة وشاملة لجميع أنشطة المشروع لتجنب الاشكاليات التي قد تحدث في الموقع بين اطراف المشروع، من ناحية أخري ينصح المقاول الباطن بتوظيف عدد كافٍ من العمال المهنيين الفنيين من ذوي الخبرة المناسبة لأعمال المشروع، وتجهيز جميع المواد والمعدات اللازمة لإنجاز العمل.

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List of Abbreviations

CSFs	Critical success factors
GDP	Gross domestic product
PCBS	Palestinian Central Bureau of Statistics
UNSCO	United Nations Special Coordinator for the Middle East Peace Process
WBGS	West Bank and Gaza Strip
PCU	Palestinian Contractors Union
SPSS	Statistical package for the social sciences
AGCA	Associated General Contractors of America
DEA	Data Envelopment Anaysis
WEBSES	Web-Based Subcontractor Evaluation System
RII	Relative important index
ANOVA	Analysis of Variance

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CHAPTER 1 . INTROUDUCTION

This chapter introduces the thesis by providing a brief discussion of the issues involved in the research. The problem statement, aim, objectives, hypotheses, limitation and the steps of research methodology are presented in this chapter.

1.1 Background and problem statement

El-namrouty (2012) stated that construction industry is one of the main sectors of the Palestinian economy. It plays significant role in the economic development and the tool through which a society achieves its goal of economic growth and development. Construction industry implies a complexity as it involves raw materials, machinery, finance, technology, human resources and so on. Moreover, it has a direct influence on other industries.

Enshassi and Medoukh (2007) explained that, due to the increased number and complexity of the engineering projects, there are different stakeholders who share the responsibilities in the project such as government, developers, consultants, architects, contractors, subcontractors and suppliers. Nevertheless, subcontractors play an important role in the Palestinian construction industry as about 90 per cent of the work is performed by subcontractors. Kumaraswamy and Matthews (2000) and Mirawati et al. (2015) reported that in general main contractors can transform 90% of the total construction process or of the total project value to the subcontractors thus the success or failure of any project depended on the subcontractors' performance.

Manuel (2014) illustrated that the importance of the subcontractors is due to that approximately 80% of the dollar value of construction is implemented by subcontractors. Cox et al. (2006) stated that the degree of success of any construction project which is achieved by the contractor will significantly depend on or influenced by the performance of subcontractors so that the subcontractors is essential member of the construction projects.

Ng and Tang (2010) concluded that because of the fact that many parties participate in the construction projects and since a huge proportion of work is conducted by subcontractors, the non-performance of any sub-contracting firms can be one of the root causes for unsuccessful project. Arditi and Chotibhongs (2005) declared that the use of qualified subcontractors in the available resources has proved to be efficient and economical in addition to performing the works more quickly and at lesser cost.

Arslan et al. (2008) mentioned that subcontractor selection in construction projects is crucial. Choosing the right subcontractor for the right job influences the quality of work as well as the construction progress. Especially during the bidding process optimum selection of subcontractors is vital for an accurate and realistic bid proposal. As construction projects and sub-contract works become more complex, a combined assessment of various criteria should be considered by the general contractors in order to select the most suitable subcontractor.

On the other hand, Elazouni and Metwally (2000) stated that subcontractors have an essential role with main contractors in providing solutions for technical issues in construction projects in terms of special experience, shortage in resources and limitation in finances. Wang and Liu (2005) mentioned that a good management by the main contractors for all other stakeholders - especially for subcontractors - is important to achieve the required goal of the projects therefore subcontractors are a vital component of the success of every construction project.

Thus, this research will focus on the critical success factors (CSFs) affecting the subcontractor management in the construction industry in the Gaza Strip and their effect in reducing project's time and cost and on enhancing the good performance in construction projects.

1.2 Features of construction industry in Palestine

As mentioned before the construction industry is considered one of the most important economic sectors that affect the Palestinian national economy and play a vital role in the economic development in Palestine, which contributes in the largest part of gross national product, because of the interrelated relations with other economic activities.

El-namrouty (2012) reported that construction sector share to Gross Domestic Product (GDP) dropped from 9.6% in 1994 to 3.3% in 2009; the partial removal of border restriction on the Gaza Strip increased the share of the sector to 11% in 2011.

As shown in Fig (1.1), the service sector contributes the highest percentage in the GDP with 20.0%, and the construction industry contributed in the second phase by 14.1% of the Palestinian GDP (PCBS, 2013).

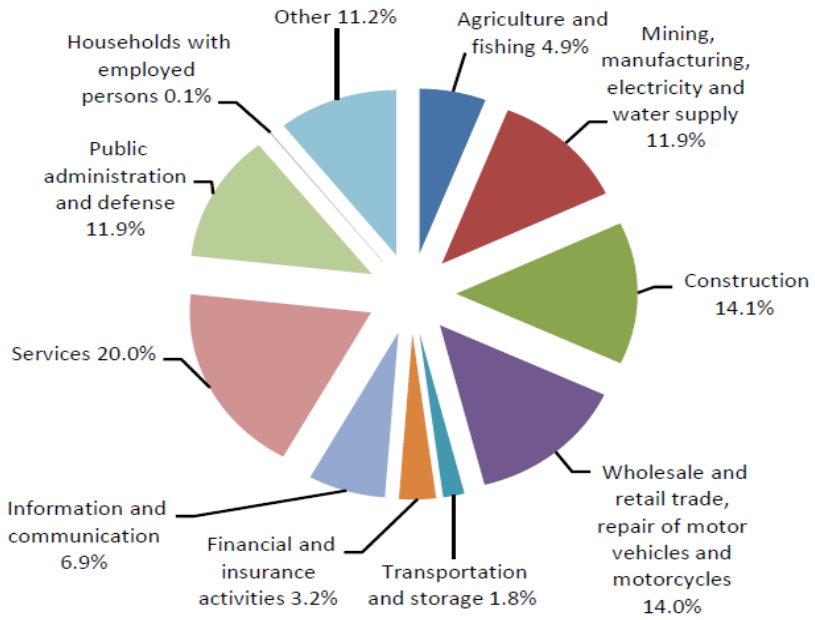

Figure 1.1: Percentage contribution to GDP by economic sector in Palestine, 2013 at constant prices (BCBS, 2013)

According Figure 1.2, the most dynamic sectors in both the West Bank and in Q2/2013 compared to Q2/2012 include transportation and storage; financial and insurance activities; mining, manufacturing, electricity, water; and construction. Three sectors, namely construction, services, public administration and defense, accounted for more than 70% of total GDP in Q2/2013 (UNSCO, 2013).

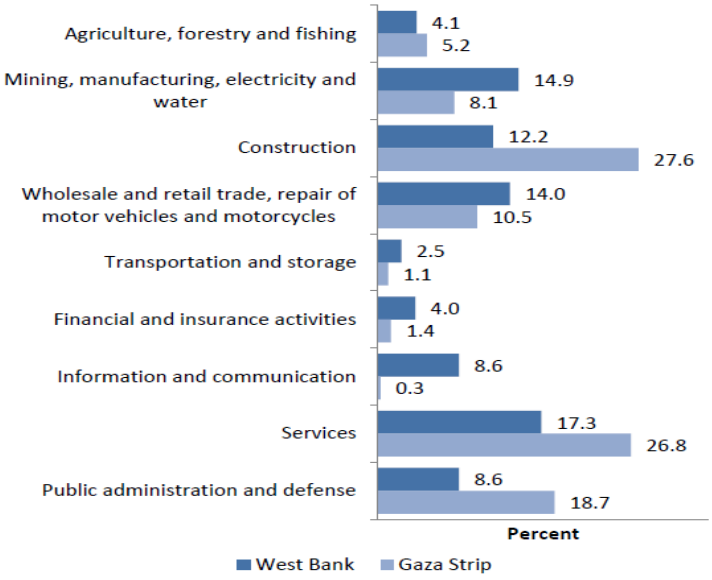

Figure 1.2: Percent contribution to real GDP by economic activity (Q2/2013). Note: Base year is 2004. Data for Q2/2013 are flash estimates (UNSCO,2013)

In the same side according Table (1.1), the value of GDP in 2013 indicates an overall growth rate of 3.8% compared with 2011 and the value of the GDP for construction industry sector in 2013 equals to 991.2 million dollars higher than in 2011 and 2012, this mean that construction industry is more active in 2013 compares 2012 and 2011.

Table 1.1: GDP by economic sector in the Palestine (UNSCO, 2013) (million $)

Economic Sector	Year		
	2011	2012**	2013**
Agriculture and fishing	380.6	332.6	345.2
Mining, manufacturing, electricity and water supply	773.5	810.5	841.1
Construction	896.8	955.1	991.2
Wholesale and retail trade, repair of motor vehicles	905.1	950.8	986.7
Transportation and storage	121.2	125.1	129.8
Financial and insurance activities	209.5	218.4	226.7
Information and communication	440.9	466.9	484.6
Services	1202.5	1362.0	1413.5
Public administration and defense	803.5	809.1	839.7
Households with employed persons	3.7	3.6	3.7
Other	684.1	763.2	792.1
Gross Domestic Product	**6421.4**	**6797.3**	**7054.3**

1.3 The nature of the construction industry in Palestinian economy

According to Palestinian Central Bureau of Statistics (PCBS, 2012), the second quarter of 2012 achieved a growth of 9% over the previous quarter, mainly spurred by a 21% increase in the share of the construction sector. As shown in Table 1.2 that, 14.7% of the employed persons in the West Bank and Gaza Strip (WBGS) were working in construction.

There is 20% increase in the contribution of the construction sector in 2012 compared to the previous quarter; and a growth of 6% compared with the corresponding quarter of 2011. But it is estimated that since last June in 2013 the Gaza economy has lost around $230 million (nearly 10% of Gaza's GDP in 2012) due to the closure of around 80% of the trade tunnels connecting Egypt and . This decreased the supply of critical goods into Gaza, such as fuel and construction materials. As a result of the shortages, 90% of Turkey and Qatar funded construction projects in Gaza were suspended, resulting in 20,000 construction workers being laid off (Kanafani, 2012).

Table 1.2: Percentage distribution of employed persons aged 15 years and over (PCBS, 2012)

Economic Activity	Total	Place of work		
		Israel and Settlements	Gaza Strip	West Bank
Agriculture, fishing and forestry	12.7	10.9	8.9	14.9
Mining, quarrying and manufacturing	11.7	10.9	5.4	14.9
Construction	14.7	56.9	8.7	11.4
Commerce, restaurants and hotels	19.7	11.8	18.1	21.7
Transportation, storage and communication	6.3	6.2	7.3	5.9
Services and other branches	34.9	3.3	51.6	31.2
Total	**100**	**100**	**100**	**100**

As shown in Table (1.3), the labor force participation rate in the Palestinian Territory rose to 43.6% in 2013 compared to 41.1% in 2010. The number of persons participating in the labor force in the Palestinian Territory was about 1.109 million in the 2nd quarter 2012: about 738 thousand in the West Bank and about 371 thousand in the Gaza Strip. The unemployment rate in the Palestinian Territory fell from 23.7% in 2010 to 20.9% in 2011, and then rose to 23.0% in 2012 and to 23.4 in 2013. It fells from 37.8% to 32.6% in 2013 in the Gaza Strip and rose from 17.2 % to 18.6% in the West Bank (PCBS, 2014).

Table 1.3: Population aged 15 years and above in Palestine by labor force (PCBS, 2014)

Labor Force Characteristics and Region	2010	2011	2012	2013
Palestinian Territory				
Labor force participation rate	41.1	43	43.6	**43.6**
Unemployment Rate	23.7	20.9	23	**23.4**
West Bank				
Labor force participation rate	43.7	45.5	45.5	**45.0**
Unemployment Rate	17.2	17.3	19	**18.6**
Gaza Strip				
Labor force participation rate	36.4	38.4	40.2	**41.2**
Unemployment Rate	37.8	28.7	31	**32.6**

As shown in Table 1.4, in 2013, more than one third of employed persons (35.7%) in the Palestinian Territory were employed in the services sector and 19.6 % were employed in commerce, hotels and restaurants. About 15.6% of employed persons worked in the construction sector in 2013, that mean the construction sector located in the third place of percentage distribution of employed persons in the Palestinian territory by economic sector and this is as in 2010 to 2013. (PCBS, 2013)

Table 14.: Percentage distribution of employed persons Aged 15 years and above in Palestine by economic sector (PCBS, 2013)

Economic sector	2010	2011	2012	2013
Agriculture, hunting, forestry & fishing	11.8	11.9	11.4	**10.5**
Mining, quarrying & manufacturing	11.4	11.8	11.9	**12.2**
Construction	13.2	13.9	14.4	**15.6**
Commerce, hotels & restaurants	19.3	20.3	19.6	**19.6**
Transportation, storage & communication	6.0	6.1	6.5	**6.4**
Services & other branches	38.3	36.0	36.2	**35.7**
Total	100	100	100	**100**

1.4 Problem statement

Subcontractors have been considered to be one of the essential parties of the construction industry in the Gaza Strip. One of the critical problems in the construction industry is the subcontractor's management. The bad management will lead to delay the project completion, and increase the overall cost of the projects. This pushed many of researchers to study this phenomenon and they found out as mentioned before that

approximately 80% of the dollar value of construction is accomplished under subcontracts (Manuel, 2014). Most of the general contractors in the Gaza strip transfer works to the subcontractors, and a huge proportion of work are conducted by subcontractors.

Therefore, it is essential to study the CSFs that affecting the management of subcontractors that play important role in the success of the construction projects.

1.5 Aim of the research

This research aims to improve the management of construction projects through improving the management of subcontractors in construction projects in the Gaza Strip.

1.6 Objectives of the research

The specific objectives of this research are:

- To identify the critical success factors (CSFs) affecting the subcontractors' management in the construction project.
- To investigate the barriers for the good performance of subcontractors.
- To investigate the effect of subcontractors' management in saving the project cost and time.

1.7 Research hypotheses

Ho 1. There is relationship between the subcontractor's performance and CSFs of the subcontractors.

Ho 2. There is relationship between subcontractor's management and the saving of the project cost.

Ho 3. There is relationship between management of the subcontractors and saving the project time.

1.8 Research limitation

- The research is limited to the first, second and third classes of contractors according the Palestinian Contractors Union (PCU). Other classes of contractors fourth and fifth could be covered in further researches.
- This research is conducted at the Gaza strip only, due to limitation of movement between Gaza Strip and West Bank (GSWB).
- There are no official records for the number of subcontractors working in the Gaza Strip. Therefore, arbitrary numbers of subcontractors are selected based on researcher experience.

1.9 Research methodology

Stage 1: Literature review

The researcher will review the relevant literature on the subject regarding the CSFs that affecting management of the subcontractors that play important role in the success of the construction projects.

Stage 2: Structured interview and pilot study

It will take the form of structured interview with experts in the field of management of the subcontractors in construction projects. The experts included project's managers, contractors, and subcontractors. This pilot study was the pre stage to develop the final form of questionnaire. In this stage of the pilot study, there will be an amendment, modifications, omission, addition or developments of the questionnaire to be ready for the final stage of distribution.

Stage 3: Final questionnaire preparation

After the development of all factors based on the structured interview and pilot studies, the questionnaire will be distributed among the contractors and subcontractors in this field to obtain their perspectives regarding the mentioned aspects of success factors affecting on management of subcontractors in construction projects.

Target Group: The study will focuses on the main contractors who are classified under (1st, 2nd and 3rd) class categories according to the classification of the PCU and some of the qualified subcontractors in the construction industry.

Stage 4: Analysis of results

- Statistical analysis and tests will be conducted by using statistical package for the social sciences (SPSS) program.
- It is expected that this study will provide some factors that affecting on the success management of the subcontractors in construction industry.

Stage 5: Conclusion and recommendations

This stage involves writing up conclusion and suggested recommendations for further studies.

1.10 Research structure

The thesis consists of five chapters as follows:

Chapter1 : Introduction

This chapter has a general introduction to the subject of the thesis. It describes the rational of the research, research objectives, and the research methodology. The research aim, hypotheses and limitations are also stated in Chapter one.

Chapter2 : Literature review

All the available information classified under relevant literature is discussed in this chapter. The main topics stated in this chapter are: subcontracting background, subcontractors' selection criteria, factors affecting the management and performance of subcontractors and the impact of application of subcontracting system to project time and cost.

Chapter3 : Methodology

This chapter defines the process of the methodology that will be applied through the questionnaire and interview.

Chapter4 : Discussion of results

This chapter presents the results of the research and discusses them in details.

Chapter5 : Conclusion and recommendations

This chapter stated the conclusions and recommendations.

References

Appendixes

CHAPTER 2 . LITERATURE REVIEW

The literature review presents information about the topic of subcontracting in general including background information about the CSFs for subcontractors' management in the Gaza Strip.

The specific areas of study are:

- Subcontracting background,
- Previous local studies about subcontractors in the Gaza Strip,
- Project success,
- Subcontractors selection criteria,
- Problems faced by contractors,
- Conflicts in the main contractor-subcontractor work relationship.
- Factors affecting the management and performance of subcontractors in the construction project.
- Impact of application of subcontracting system to project time and cost.

Despite that the subcontracting is a common practice in the construction industry and the realization of the vital impact of subcontractors' management on overall project success, little prior research has been conducted to aid general contractors in managing the subcontractors and to find the CSFs that affecting their performance.

2.1 Subcontracting background

Subcontracting is a common practice in the construction industry. On any particular project, general contractors may rely on many subcontractors to perform specific tasks such as construction works, electrical works , mechanical works , drywall, roofing, steel erection and so on (McCord and Gunderson, 2013).

Subcontracting has been defined as the act of general contractors hiring specialty contractors (subcontractors) to help them overcome problems on the jobsite such as the need for special expertise, shortage in resources of the general contractor, and limitation in finances. General contractors may be able to complete specialty tasks on their own, but this may result in more risks and costlier. Because of this general contractors utilize subcontractors to perform specialized duties, which enable them to cut costs and possess a higher level of efficiency (Elazouni and Metwally 2000).

According to the Associated General Contractors of America (AGCA), domestic subcontractor is the independent contractors who perform the works, normally for a portion of the works described in the contract document. Domestic subcontractors also can be defined as any person, supplier, distributor, vender or organization which furnishes suppliers or services to the main contractors either directly or through another subcontractor. Subcontractors can be defined as one who enters into a subcontract; individual or company that is hired to perform part of the work of principal contractor. Another definition was given by Hinze and Tracy (1994) who stated that the subcontractors are specialty contractors who are hired to perform specific tasks on a

project (cited in Enshassi and Shoman, 2008). Fah (2006) defined subcontractor as one who enters into a subcontract; individual or company that is hired to perform part of the work under main contractor and have no relationship with client directly. And he stated that the contractors normally sublet the works to the subcontractors to transform the risks.

As cited in Enshassi and Medoukh (2007) that there were two types of subcontracting as specialist subcontracting and volume subcontracting. Specialist subcontracting can be used, when the main contractor was not able to implement the work himself, because he/she is not a specialist in this, so he obtains goods or services, and made a contract with subcontractor. Volume subcontracting can be used when an enterprise commission a subcontractor because, while technically able to carry out the work, it is overloaded and has to obtain additional capacity from another source or contractors.

Furthermore, Shash (1998) stated that many general contractors act like project agents where they transfer the actual project tasks to subcontractors for execution. Wang et al. (2005) mentioned that in the construction industry a winning bid is always subdivided into multiple subcontracts.

Gould and Joyce (2009) illustrated that general contractors utilize subcontractors for various reasons such as: the lack of his experience in the work to be implemented, risk limitation and saving workforce which gives opportunities to bid on new projects. Wang et al. (2005) explained that general contractors normally transfer the works to the subcontractors because of the increased project complexity and the competitive nature of the construction industry. Arditi and Chotibhongs (2005) showed that the success of any construction projects depend on subcontractors behaviors and they defined the subcontractors as a construction firm that contracts with a general contractor to perform some aspects of the general contractor's work. In the usual case, the general contractor will perform the basic operations and transfer the other works to various specialty subcontractors.

In another side; Fah (2006) stated that the main contractors control the terms of agreement or contract with domestic subcontractors by negotiation. The payment for subcontractors is under the responsibility of the main contractors. Subcontractors may carry out ordinary construction works or may be a specialist in certain field of works. They are working under main contractors and have no relationship with client directly.

2.2 Previous local studies

Enshassi and Shoman (2008) studied the subcontractor's selection practice in the Gaza Strip. They identified several factors considered by general contractors in the selection of subcontractors and determined their level of impotence from the general contractor's viewpoint. The general contractors have ranked the following ten factors which affect their decision in selecting subcontractors: project size and complexity, compliance with specification quality, compliance with project schedule, Subcontractor previous experience and reputation, natural and specialty of subcontractors, practical and technical ability, good quality record, qualified supervisory staff, creativity and financial ability. Enshassi et al. (2010) identified several factors used by main

contractors in the selection of suitable subcontractors in such as adherence of the subcontractor to contract terms, adherence to time schedule, commitment to prices, good reputation, expertise in certain type of work, commitment to quality and the existence of required equipment and machinery, and they propose recommendations for improving the selection of subcontractors such: contractors should select the subcontractor according to previous experience, reputation and capabilities in terms of labour, equipment and machinery.

Enshassi and Medoukh (2009) studied the relationship between the general contractor and subcontractors from the general contractor's view and they find that 90 percent of the work is performed by subcontractors and find that general contractors select subcontractors according to the complexity of the work and previous experience with subcontractors.

Tayeh (2009) studied the relationship between contractors and their subcontractors in the Gaza Strip, The study revealed the important factors used by general contractors for selection of suitable subcontractors include: adherence of the subcontractor to the contract terms, adherence to time schedule, commitment to prices, good reputation, specialty in certain type of work, commitment to quality and the existence of required equipment and machinery. The study recommended several actions to improve the relations between the contractors and their subcontractors. For example, the contractor should select the subcontractor according to his experience, capabilities, resources and reputation. On the other hand, the subcontractor should do his best to complete the works on time, adhere to all contract terms and conditions and to keep the best quality of work.

Enshassi et al. (2008) studied in their paper about safety performance of subcontractors in the Palestinian construction industry and they identified, evaluated, and ranked factors that influence safety performance of subcontractors in (Palestine) according to their relative importance for improving site safety such as training, contract items, safety plans, motivation, safety rules and regulations, hiring of safety officers, avoiding worker turnover and worker replacement and financial constraints and hard economic circumstances. It is recommended that the subcontractors and workers should attend continuing safety programs on regular basis as part of their perquisite to work in construction sites.

Enshassi et al. (2009) studied in their paper the factors affecting the performance of construction projects in and perceptions of their relative importance and they found that the most important factors affecting project performance are: delays because of borders/roads closure leading to materials shortage; unavailability of resources; low level of project leadership skills; escalation of material prices; unavailability of highly experienced; qualified personnel; and poor quality of available equipment and raw materials. Based on these factors, the paper recommends that: 1) project owners must work collaboratively with contractors and facilitate regular payments in order to overcome delays, disputes and claims; 2) project participants should actively have their input in the process of decision- making; and 3) continuous coordination and relationship between project participants are required through the project life cycle in order to solve problems and develop project performance.

Enshassi et al. (2007) provide insight into the perception of construction managers towards safety in Palestine so that a survey of local construction managers was conducted in to identify the common industry characteristics which affect safety, and the different factors that directly or indirectly cause site accidents. They find in their paper that the most important industry characteristics that give rise to safety challenges: poor accident record keeping and reporting systems; extensive use of subcontractors; and lack of safety regulations and legislation. The results also indicated that the main factors leading to site accidents are: lack of supervision and control on workers' adherence to wear personal protective equipment, lack of regular safety meetings, and the lack of respect for the few available safety regulations.

El-namrouty (2012) studied the impact of construction sector on Palestinian economy, and takes the Gaza strip as a case study of this research and he found that the performance of construction sector is affected by some independent variables, such as, investment, foreign aid and other variable. Performance of the construction sector will affect GDP growth rate and the share of construction sector in Palestine GDP. This study indicates that investment in the construction sector would be a major generating of income and jobs for labour force. Statistical results showed that foreign aid was more significant than investment to GDP growth in Palestine, but smaller than investment in the Gaza strip, so it's recommended that government and financial sectors must support and increase the role of the private sector in the economy.

Mahamid (2013) identified in his study the principal factors impacting labor productivity of public construction projects in the West Bank in Palestine from the contractors' viewpoint. The analysis of the identified factors indicated that the top ten important factors negatively affecting labor productivity of public construction projects in Palestine are: political situation, equipment shortages, old and inefficient equipment, lack of labor experience, poor site management, poor communication and coordination between construction parties, payments delay by the owner, low wages, rework, and misuse of time schedule.

2.3 Project success

Project success is an important project management issue, it is one of the most frequently discussed topics. Pheng and Chuan (2006) defined project success as the completion of a project within acceptable time, cost and quality and achieving client's satisfaction. Project success can be achieved through the good performance of indicators of the project.

Chan et al. (2002) stated that a construction project is considered successful when it is completed on time, within budget, and of acceptable quality regardless of the complexity, size, and the environment within which it is constructed. However, construction performance is subject to many variables and unpredictable factors. The performance of parties, resource availability, environmental conditions, and contractual relations contribute to construction performance.

Bakert et al. (1988) concluded that, the project is considered an overall success if it meets the technical performance specifications and/or mission to be performed, and if

there is a high level of satisfaction concerning the project outcome among key people in the parent organization, key people in the client organization, key people on the project team, and key users or clientele of the project effort, and if the project completed on schedule and staying within the budget, and next to all above effective coordination and relation patterns are the most important contributors to perceived project success.

Bakert et al. (1988) found that the project is considered an overall success, if the project meets the project technical performance specifications or mission to be performed, and if there is a high level of satisfaction concerning the project outcome among key people on the parent organization, key people in the client organization, key people on the project team, and key users of the project effort. Arditi and Chotibhongs (2005) stated that subcontractors are very important to the successful completion of most construction projects. Yoke-Lian et al. (2012) stated that success of a construction project is essentially depending on the ability of general contractor to select the appropriate subcontractor during bidding process, and the sufficient management of subcontractor during construction.

In another hand Ng and Tang (2010) stated that there is significant factors concerning subcontracts that can play a vital role on the overall success of the construction project especially in today's highly competitive environments such as the reputation, staff qualifications capability of key personnel, competency of the team, top management support, track record, organizational structure, employee enhancements, market conditions, and political environment.

The performance of the subcontractors in the construction projects affected on the overall success of any construction project that achieved by the main contractors. So that the subcontractors is essential member of the construction projects (Cox et al., 2006).

Prabhakar, G.P. (2008) stated that project manager is an important factor leading to project success, and in previous studies it was assumed that if a project's completion time exceeds its due date, or expenses overran the budget, or outcomes did not satisfy a company's predetermined performance criteria, the project was assumed to be a failure. Today we know that determining whether a project is a success or failure is far more complex.

2.4 Subcontractors selection criteria

Subcontractors perform most of the construction works and their effect on industry is apparent in different activities of construction. Therefore, contractors companies should give more attention in the subcontractor's selection methods in construction industry.

Errasti et al. (2009) explained the subcontractor's operation in the construction industry as follow design consultants produce a product specification, costing and bill of quantities based on a client's brief. Thereafter, the project will be passed to a contractor who will take responsibility for the overall project facilities. Then general contractor rely on subcontractors who have specialist skills and expertise to perform specific tasks

from the project. These subcontractors are subject to tremendous pressures in terms of quality, service and cost.

Tserng and Lin (2002) explained that it's crucial to select appropriate subcontractors to implement specific subprojects. Hadipour et al. (2012) stated that one of the most important concerns in project management applied in general contractor organizations is the method of subcontractors selection based on defining appropriate criteria and applying a practical method. In the construction industry, the subcontractors selection by the main contractors depend on their performance as an important index as presumed that a subcontractor's historical performance can predict future performance (Cheng et al., 2011).

El-Mashaleh (2011) stated that subcontractors' selection decisions are of prime importance to general contractors bearing in mind that such decisions are exercised by general contractors multiple times in every single project, and his paper contributes a Data Envelopment Analysis (DEA) model to guide general contractors in their subcontractor selection decisions. Fah (2006) stated that sometimes the client may wish to exert influence over the subcontractors' selection on the project. The construction industry contract may enable client to select a subcontractor, known as nominated subcontractor because of many reasons such as the previous cooperate working experience with a subcontractor.

In their subcontractor selection practice, general contractors rely heavily on subcontractors bid proposal to make selection decisions. The lowest bid price is usually the key determinant factor for selecting subcontractors (Arslan et al., 2008; Tserng and Lin, 2002).

Ng et al. (2008) indicated that there are several factors impact the subcontractors selection criteria such as business experience, highest value of relevant subcontracted work completed in the past, number of relevant projects completed, previous relationship with the contractor, financial capacity, completion of job within time, standard of workmanship, quality of materials used, delay in payment to labor, failure to adhere to subcontract provisions, safety record (incident rate), and non-adherence to relevant environmental regulations and so on.

Kargi and Ozturk (2012) found in their paper eight main criteria and twenty nine sub-criteria for the subcontractors selection problem for textile such as compliance with the plan, social appropriateness, cost, quality control systems, financial capacity, technical capacity, firm's location and experience and willingness to work respectively.

Hadipour et al. (2012) explained that in project management applies in general contractors' organization it is important to select sub-contractors based on defining appropriate criteria and applying a practical method. They proposed an interval-valued fuzzy technique applied for selecting subcontractors. Six pre-defined criteria have been defined as follows:

- Related Execution History (C1);
- Available Facilities (C2);

- Adequacy of Technical Team (C3);
- Financial Ability (C4);
- Company's Antiquity (C5);
- Previous Employers Satisfaction (C6).

Kumaraswamy and Matthews (2000) showed that the success of the construction projects may depend on the philosophy of selecting "the right person for the right job". Clearly, the correct choice of subcontractors increases the overall success of a construction project. However, in construction industry in the Gaza strip contractors neglect the importance of the subcontractor selection and the subcontractor selection is mostly depend on the lowest price. Cheng et al. (2011) identified twelve key factors used by general contractor to assess potential subcontractors and for right selection of the subcontractors.

- Construction technique;
- Duration control abilities;
- Cooperative managers;
- Material wastage;
- Services provided after work completion;
- Collaboration with other subcontractors;
- Safe working environment;
- Self-owned tools;
- Clean working environment;
- Effective management capabilities;
- Manager personality;
- Financial condition.

Ng, S.T. (2009) stated that some of the key performance evaluation criteria for subcontractors to win any job are: facing severe competition and reduced demand, reputation and company history.

Arslan et al. (2008) mentioned that in the subcontractors' evaluation system in construction projects, subcontractors can be evaluated according to the sets of evaluation criterion which are grouped under these headings: cost, quality, time and adequacy. Each of these main criteria is divided into sub-criteria as shown in Figure 2.1 below.

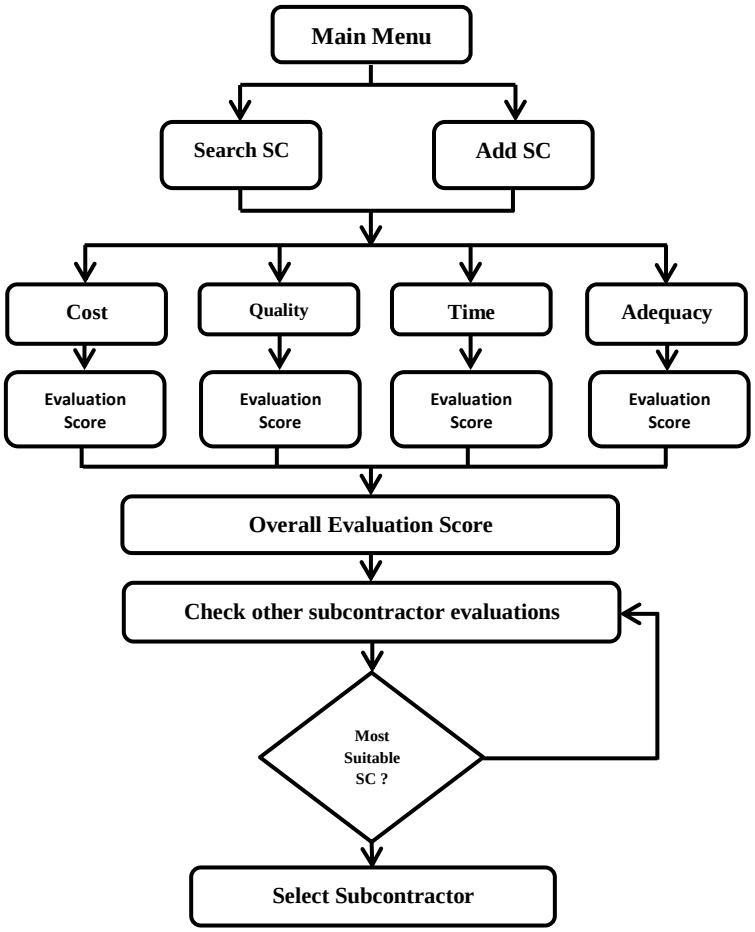

Figure 2.1: Evaluating and selecting sub-contractors using WEBSES (Arslan et al., 2008)

Arslan et al. (2008) explained that bidding process is one of the most important phases in the construction industry. During this stage, selecting the most appropriate sub-contractors for the relevant sub-works is highly critical for the overall project performance. In order to select the most appropriate subcontractors for the project and prepare the most realistic and accurate bid proposal, general contractors have to know all financial, technical and general information about these subcontractors. Within this context, general contractors should consider several factors in the selection process. These factors may include the quality of production, efficiency, employment of qualified members, reputation of the company, accessibility to the company, completion of the work on time etc. They have proposed a Web-Based Subcontractor Evaluation System (WEBSES) that can help the construction contractors to select the most appropriate sub-contractors in which they categorized the selection factors into four main headings as cost, quality, time and adequacy as shown in Figure 2.2.

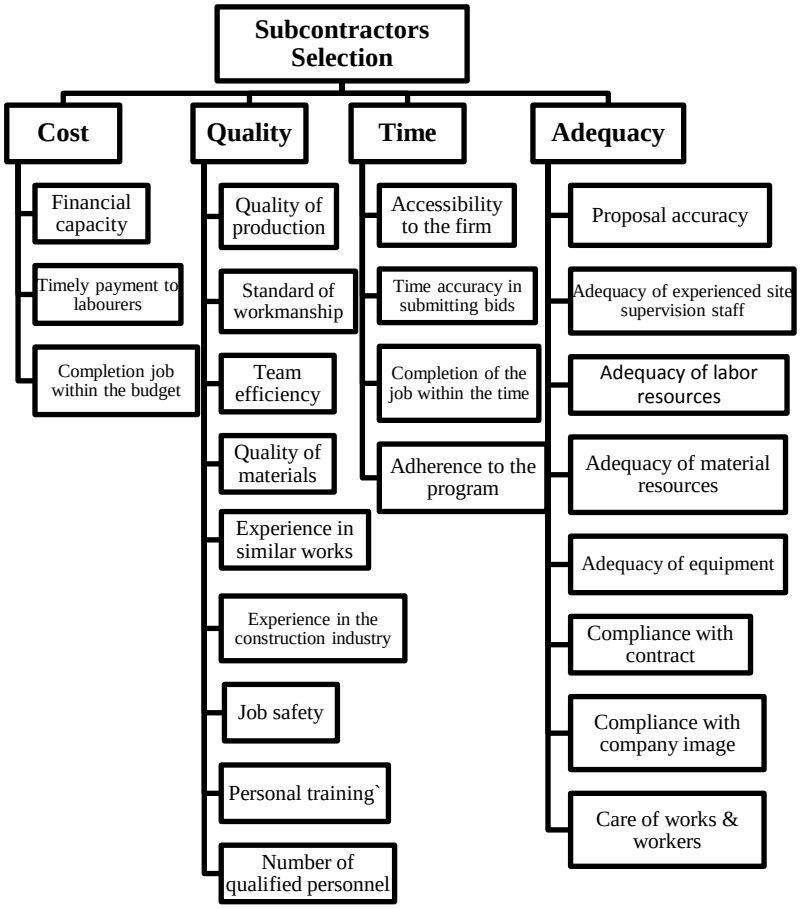

Figure 2.2: Evaluation criteria for subcontractors' selection (Arslan et al., 2008)

Finally as mentioned in El-Mashaleh (2009), the reliance of general contractors on subcontractors to execute major portions of construction work makes the success of construction projects highly susceptible to the performance of these subcontracting organizations. So one of the prime important decisions for Contractors Company is subcontractors' selection decisions, these decisions are exercised by general contractors multiple times on every single project.

2.5 Problems faced by contractors

Fah (2006) illustrated the type of the problems faced by the contractors in the construction projects:

2.5.1 The problems caused by contractors themselves

- Management weakness,
- Technical weakness,
- Finance management problem,
- Construction material problem.

2.5.2 The outside problem

- Supply of construction material,
- Relationship between government agency,
- Labour,
- Relationship with project parts (subcontractors , suppliers , labors, client, crew supervision),
- Relationship with local people.

2.6 Conflicts in the main contractor-subcontractor work relationship

Contractually, main contractors are responsible for the construction of projects, and no relation between owner and any other part of the project rather than main contractors, but they hire subcontractors and/or specialist contractors and suppliers to perform specific tasks as part of the overall project. They do this to reduce their overhead and operating costs, improve efficiency, decrease project complexity, mitigate project risks, reduce project delays and achieve a more economic delivery of projects. However, to be successful at this, they must develop enduring relationships with key suppliers and subcontractors and in general should enhance the management of all stakeholders - especially for subcontractors in the project by the main contractors (Akintan and Morledge, 2013).

McCord and Gunderson (2013) studied the most important factors affecting on the overall success of the project is the general contractor - subcontractor relationship and he stated that the top three relationship factors are: bid shopping, project manager relationship and superintendent capability, respectively. The general relationship factors in order of importance as determined by subcontractors are:

- Bid shopping,
- Project manager capability,
- Project manager fairness,
- Superintendent,
- Timeliness of payments,
- Safety,
- Financial capacity,
- Retainage practices,
- Future work,
- Previous claims,
- The pay-when-paid clause,
- Indemnity clauses,
- Back charging,
- Insurance,
- Bonding,
- Takeover of equipment,
- Termination for convenience.

2.7 Factors affecting the management and performance of subcontractors

Huang and Lu (2011) stated that the services of professional subcontractors is required for every construction project so that the quality and performance of the construction projects depended on the performance of the subcontractor workers, and they found in their paper that there several demographic variables affected the level of job performance such as age, education, number of children, payment, marital status, work experience, and work type.

Ng and Tang (2010) illustrated that subcontractors are a vital component of the success of every construction project and the success factors affecting the subcontractors can classified as those related to the project or an organization and in another hand, there is an important factors that affecting the performance of the subcontractors such as timely completion of project, profit, management level leadership, staff qualification/skill, reputation, payment method, company history, project procurement method, safety, bidding method, insurance, bond and relationship with main contractors. Also he presented some of success factors that have a significant bearing to the overall success of the construction projects especially in today's highly competitive environments such as the reputation, staff qualifications, capability of key personnel, competency of the team, top management support, track record, organizational structure, employee enhancements, market conditions, and political environment.

Ng et al. (2009) stated that subcontractors are considered more capable of maintaining a high quality performance or improving inadequate performance and gain a greater chance of success when they have a good reputation and sound company history. Eom et al. (2008) stated that subcontractor evaluation and management processes must include factors that will enhance cooperative relationships, in particular, sharing mutual objectives, improving communication, participating in collaborative work, and developing cooperative relationships.

Tam et al. (2011) stated that subcontracting system is widely used within construction industry, and it has many advantageous in many aspects such as better efficiency of subcontractors' operation due to their unique skills. Ng et al. (2008) also displayed many other factors that effect on the management of the subcontractors in the construction projects such as performance of relevant previous projects, standard of workmanship (Quality), compliance with regulations, prompt payment to labourers, adherence to programme, regular and effective communication with main contractor, adherence to subcontract requirements, compliance to environmental regulations under relevant statutory body, number of experienced site supervisory staff, inspection and maintenance of work environment, number of craftsmen and labourers, quality of shop drawings and as-built drawings and ability to undertake the size of work and so on.

Thus many of the critical factors affecting on the subcontractors management, operation and performance in the construction projects will be displayed and discusses.

2.7.1 Technical and managerial skills

Hughes (1986) stated that a project fails because of improper managerial principles at all project members, such as improper focus of the management system, by rewarding the wrong actions and the lack of communication of goals (cited in Pheng and Chuan, 2006). Ng and Tang (2010) found that one of the most significant success factors that enable the subcontractors to perform their tasks successfully and to achieve the project and organizational goals is managerial and technical skills and the most valued resources of the organization or the construction company is the subcontractor's skills.

Mustapha and Naoum (1998) mentioned that managerial effectiveness is related to many subjective factors related directly to the site managers such as ability to liaise with the building team, controlling the quality standards, managing the resources, motivating the operatives etc. And stated that the effectiveness of the site managers depend upon personal factors, project characteristics, job conditions and organizational variables.

In another hand, Ng et al. (2003) postulated that efficient resource planning could improve the project delivery time by as much as 45% and save up on project costs by up to 7%. Poor managerial skills can defeat the most successful activities and in many cases can lead to the demise of the organization. Hence, subcontractors must possess adequate leadership and managerial and technical skills to manage and plan for projects in the most efficient and economical way. Many sub-contractors have poor educational backgrounds therefore it is important to increase the training programs for the subcontractors about these technical and managerial skills to improve or enhance performance of their operations on site and to achieve the required goals of the project.

Mahamid (2011) concluded that poor site management could be as a result of series of factors such as: poor labor management, poor communications between labors and managers, poor communications between construction parties, poor material management, lack of site manager experience, lack of labor experience, etc.

2.7.2 Financial capabilities of the main contractor & subcontractors

Ng et al. (2008) stated that subcontractors must have a good financial background to demonstrate that they have the necessary resources to complete the work. On the other hand having a strong financial background may also help subcontractors in securing loan when needed. Arditi & Chotibhongs (2005) illustrated that the major cause of friction and disputes between main contractor and subcontractors is delayed payments from the general contractors to subcontractors.

Subcontractors should maintain appositive cash flow and a good track record of settling liabilities because it is difficult to expand their business and achieve a growth in revenue without a good financial track record (Ng and Tang, 2010)

Ng et al. (2008) illustrated that the prompt payment to laborers is the most critical factors that affecting on the success of the construction project which mean also substantially affecting on the project management system. Because of that the skilled and unskilled workers reluctant to stay in the project without receiving their wages

regularly and that the irregularly wages or payment adversely effect on the demoralized of the workers which subsequently lead to slow progress, quality weakness and undesirable delays so the contractors and subcontractors must paid more attention to this subject and contractors should enhance relationship with subcontractors and labors to keep the success of the project and to achieve good performance. They must have a good financial background to demonstrate that they have the necessary resources to complete the work.

Sears et al. (2008) showed that general contractors are notorious for being slow to pay their subcontractors for completed work. Although the general contractor has the contractual right to withhold payments for many reasons, this can be a major source of disputes between the subcontractor and general contractor. Payment and profit is a main concern for subcontractors and no issue is more important than payment.

Knutson et al. (2003) explained that a subcontractor can choose which general contractor to work with and this business decision can be affected by a number of factors. The capability of the general contractor can be significant factor when considering future work with that general contractor.

2.7.3 Subcontractors qualification and experience

Kang (2011) stated that construction project quality and duration was affected by the performance and quality of the subcontractor's construction team and this play an important role in determining a project's economic performance. In addition, Zhengquan (2005) stated that some contractors have subcontracted certain works to unqualified subcontractors, in order to maintain special relationships or lower project cost, leaving hidden dangers of uneven contract performance. Ng et al. (2003) stated that the quality of work can suffer when incapable or inexperienced subcontractors are employed.

Ng et al. (2008) postulated that due to the increasing awareness of the problems caused by inferior subcontractors in the construction projects, the selection of the capable subcontractors from appointed subcontractors that apple to complete the subcontracted tasks successfully or satisfactorily is difficult, therefore the main contractors would submit the subcontractors who have previous relationship or subcontractors who have satisfactorily completed works of similar nature, size and complexity for other contractors before. So the previous experience and performance of relevant projects by subcontractor's construction team was considered to be of paramount importance by the contractors and client group in determining whom to invite to submit a quotation for a subcontract.

Cheng et al. (2011) stated that the subcontractors performance is an important index that reflects previous performance, and they assumed that we can predict future performance of subcontractor's construction team from historical performance mean past experience, in spite of the fact that predicting subcontractor performance is a complex process with uncertainties that require judgments based on human expert knowledge and experience. Therefore Ng and Tang (2010) concludes that it is widely accepted and perhaps self-

evident that the quality of completed works in a construction project is directly related to the skill level of the workers of the subcontractors' construction team.

Ameh and Osegbo (2011) recommended that the project manager should ensure that both nominated and domestic sub-contractors on any project have a high experience and work plan to meet the requirements of the project. Pre-qualification of these sub-contractors would ensure that they have sufficient experience, proficiency and capacity to deliver not only quality work but on time.

Arslan et al. (2008) explained that construction companies should consider several criteria of the subcontractors selection rather than bid price such as past experience, financial stability and quality of products. This method can eliminate insufficient financed, inexperienced and incompetent subcontractors, reduce risks and contribute significantly to the overall success of the project. Mahamid (2013) stated that in general, experience improves both the intellectual and physical abilities of labor that consequently improves productivity of the work. And he detect that one of the main problems in Palestinian construction industry is lake of skilled labors, engineers, and managers. Ng and Lu (2008) postulated three factors used in evaluating the past experience of any subcontractors which is the number of relevant project completed, highest value of relevant subcontract work completed and any adverse report on relevant previous projects.

2.7.4 Bid shopping

Arditi & Chotibhongs (2005) defined bid shopping as a way of life in the construction industry and stated that the practice of bid shopping by general contractors is considered to be a serious breach of trust from the subcontractor's perspective. Ng et al. (2008) stated that bid shopping is a common phenomenon in construction subcontracting, some subcontractors may be under pressure to submit unrealistically low subcontract bids and finish their work in a sloppily manner.

Knutson et al. (2003) explained that very few general contractors have the capacity or expertise to self-perform all aspects of a construction project so they typically solicit bids from subcontractors when preparing a bid. When determining which subcontractor to hire for a particular construction project, the general contractor may indulge in the practice of bid shopping or bid chiseling.

These practices are harmful to the subcontractor, contributing to poor quality workmanship and sometimes even the insolvency of the subcontractor. This is one of the major factors affecting sub-contractors operation and performance in the construction industry.

2.7.5 Project manager relationship & experience

Project manager is the most important person in the project leading to project success, Ng and Tang (2010) stat that, a good relationship between project manager and all project participants can also help improve the morale of sub-contractors' team. In

another hand, this morale of the subcontractors' team may be an indicator or lead to success the project. In general, workers' performance can be enhanced if they are willing to work closely together to complete the works in the best possible way.

Pheng and Chuan (2006) stated that a project manager is vital and indispensable in any project. And project success is a core concept of project management to a project manager. They supposed that the success of a project hinges on the performance of project managers, with emphasis on the achievement of time, cost and quality targets and in another hand they stat that successful project completion can depend to a large extent upon members being able to work together effectively as a project team.

In the same context; Rubin and Seeling (1967) showed the impact of a project manager's experience on the project's success and failure. They concluded that a project manager's previous experience has minimal impact on the project's performance, whereas the size of the previously managed project does affect the manager's performance. Avots (1969) identified the main reasons for the project failure such as the wrong choice of project managers, unplanned project termination and unsupportive top management (cited in Pheng and Chuan, 2006).

Prabhakar (2008) identified that, the competence of the project manager is in itself a factor in successful delivery of projects and on the other hand, the project manager needs to have competence in those areas that have the most impact on successful outcomes. Archibald (1976) mentioned that the successful project manager should have the following skills and competencies: flexibility and adaptability, preference for significant initiative and leadership, aggressiveness, confidence, persuasiveness, verbal fluency, ambition, activity, forcefulness, effectiveness as a communicator and integrator, broad scope of personal interests, poise, enthusiasm, imagination, spontaneity, able to balance technical solutions with time, cost, and human factors, well organized and disciplined, a generalist rather than a specialist, able and willing to devote most of his or her time to planning and controlling, able to identify problems, willing to make decisions, able to maintain a proper balance in use of time (cited in Prabhakar, 2008).

2.7.6 Communication

Mirawati et al. (2015) and Tam et al. (2011) showed that proper communication between the contractor and his subcontractors and all project parties is very important and crucial to the success of the project completion.

Dossick and Schunk (2007) concluded that miscommunications and conflicts between the main contractors, subcontractors, clients and other project participants could affect negatively on the overall success of the project. Although that the coordination with various parties of the project is one of the responsibilities of the main contractor, sub-contractors should take a more care in improving the relationship with other stakeholders by keeping the others informed of their construction method/sequence and programme so that any potential problems can be resolved in a cooperative manner.

Zou and Seo (2006) found that in construction industry, the inaccurate and untimely communication between project's parties lead to costly progress delays. Thereby proper communication and sharing up-to-date information between project participants reduce errors and time delays and lead to facilitating project efficiency and ultimately improving collaboration and teamwork, also contributing to enhanced levels of cooperation and productivity.

Chan and Kumaraswamy (2002) remarked that effective communication and fast information transfer between managers and project's participants help to accelerate the building construction process and performance. Wang and Liu (2005) mentioned that the field coordination is considered the third most important factor. Some interface problems may arise during construction. Consequently, these identified problems can be solved due to field coordination meetings.

Tam et al. (2011) stated that communication among project parties is critical to the success of implementing a construction project, and the main problems in project communication and coordination include increasing communication errors when increasing layers of subcontractors; poor communication channel between main contractor and subcontractor; difficult in sharing timely information among multi-layer supply chain subcontractors; and lack of main contractor's medication on disputes among subcontractors.

2.7.7 Market position

Ng et al. (2009) mentioned that market condition can be related to the analysis of the market place in which an organization operates or has interest in developing its position. Good market condition gives adequate job opportunities to even weak subcontractors and can help foster some potential subcontractors. Adversely, a poor market would knock out some subcontractors with relatively poor performance or poor financial status through vigorous competition.

2.7.8 Construction productivity

Productivity in construction is often broadly defined as output per labor hour, or it is the amount of output produced relative to the amount of resources allocated for a project. In the construction industry, "subcontractors bear responsibility for much of the productivity levels on the construction site, particularly in areas such as labor relations, supervision, material delivery, prefabrication, standardization, worker training, quality control, and equipment maintenance" (Arditi and Chotibhongs 2005).

Enshassi et al. (2010) explained that productivity is an important issue in the construction sector in the Gaza strip, and its means cost savings and efficient usage of resources. They studied factors affecting productivity in the construction industry in the Gaza strip and find that the main factors negatively affecting labour productivity are: material shortage, lack of labour experience, lack of labour surveillance, misunderstandings between labour and superintendent, and drawings and specification alteration during execution.

Mahamid (2013) mentioned that labor productivity plays a vital role in determining the financial success of construction projects which reflects the high importance of labors in the construction industry, meaning that any improvement in labor productivity will contribute a high deal to the project outcomes improvements. He found in the study that the poor labor productivity of public construction projects in the West Bank in Palestine is mostly affected by the materials and equipment. And the top five important factors negatively affecting labor productivity of public construction are: political situation, equipment's shortages, old and inefficient equipment, lack of labor experience, and poor site management.

Ameh and Osegbo (2011) defined productivity as a ratio between an output value and an input value used to produce the product or services, examples of inputs: materials, labour, capital, energy, etc. Chan et al. (2002) stated that productivity is considered in the construction phase when the contractors organize the available resources efficiently in order to meet the cost and time targets of the construction projects.

Hsieh (1998) stated that subcontractors bear responsibility for much of the productivity achieved on the construction site, particularly in areas such as labor relations, supervision, material delivery, prefabrication, standardization, worker training, quality control, and equipment maintenance and utilization. Arditi & Chotibhongs (2005) showed that a major way to improve site productivity would be to engage subcontractors who are familiar with modern production and construction methods. Cox et al. (2006) stated that the understanding of how to motivate the construction workers play an important role in increasing the construction productivity.

Soekiman et al. (2011) identified seven factors which have high influence to project-level productivity, that is inaccurate design, unclear command to workers, changes in design, incomplete design, low skill levels of worker, inappropriate work methods and poor schedule plan. Ameh and Osegbo (2011) identified several factors affecting on the productivity in construction site such as: inadequate construction materials, availability of construction materials inaccurate drawings / specification, poor supervision, lack of skills from the workers, tools/equipment breakdown, delay, weather condition and wages.

Ng et al. (2008) stated that, from the sub- contractors' point of view, sufficient supervision could improve the productivity of labourers and would also ensure the requirements in the subcontract are duly delivered.

2.7.9 Collaboration

Abdull Rahman et al. (2014) studied in his paper the importance of collaboration in construction industry from contractors' perspectives and he found that collaboration play an important role in the success of the construction projects and the project participants are realizing that sharing of knowledge and information is one of the key elements of a successful contractual relationship, six important factors were found in the study that lead to willingness to collaborate among contractors are namely; collaboration will encourage teamwork, similar racial collaboration develops

cooperation, stimulate information sharing, improve quality and project complete on time, enhance service quality, and better communication among project members.

Eom et al. (2008) and Zou and Seo (2006) explained that sharing up-to-date information between project participants in construction industry reduces errors and time delays, thereby facilitating project efficiency and ultimately improving collaboration and teamwork. Increasing collaborative work enhances mutual relationships, also contributing to enhanced levels of cooperation and productivity.

Errasti et al. (2007) mentioned that there is a lot of advantages of the collaboration between all project's parties such as cost and quality savings on the project and project execution could be more efficient if the manufacturability of the project and ease of assembly were taken into account.

2.8 Impact of application of subcontracting system to project time and cost

O'Brien (1998) stated that subcontractor and supplier production comprise the largest value of project cost, so the poor management system of them can increase the total project cost. Tam et al. (2011) indicated that the improper using of subcontracting system in the construction projects can increase the construction cost because of many reasons such as: more overheads for managerial staff, increasing construction cost due to more abortive and remedial work, extra cost as intermediate subcontractors charging fees without adding value and increasing construction cost due to more claims and disputes. In addition Tam et al. (2011) also identified five key factors which cause ineffectiveness of the use of sub-contractor in the control of the project time such setting unrealistic contract time for the subcontracting work, subcontractors' low efficiency, subcontractors' late response to instruction because of long chain of communication, time consuming on remedial work and time consuming on solving disputes among various layers of subcontractors.

Morris et al. (2011) explained that because the costs of subcontractor are significant, a general contractor will often go to great lengths to avoid terminating a subcontractor and try to minimize cost. This can include renegotiating the contract, reducing the scope of the subcontractor's work, providing supplemental staffing, assisting with payroll and directly procuring equipment or materials. "Collaboration with subcontractor across the finish line" reflects the reality that a terminated subcontractor ends up costing all parties involved significant sums of money and significant additional times.

Arditi and Chotibhongs (2005) previously mentioned that the use of qualified subcontractors in the available resources or in general the subcontracting system application has proved to be efficient and economical in addition to performing the works more quickly and at lesser cost.

2.9 Summary of the chapter

According to previous studies, it can be concluded that the subcontracting is a common practice in the construction industry, and it is defined as the act of general contractors

hiring specialty contractors (subcontractors) to help them overcome problems on the jobsite such as the need for special expertise, shortage in resources, risk limitation and limitation in finances.

This chapter presented information about the topic of subcontracting in general including background information about the CSFs for subcontractors' management in the Gaza Strip. It is included many specific areas of study such:

- Subcontracting background,
- Previous local studies about subcontractors in the Gaza Strip,
- Project success,
- Subcontractors selection criteria,
- Problems faced by contractors,
- Conflicts in the main contractor-subcontractor work relationship.
- Factors affecting the management and performance of subcontractors in the construction project.
- Impact of application of subcontracting system to project time and cost.

The literatures displayed many project success factors that may effect on the management of the subcontractors in the construction industry such as: technical and managerial skills, financial capabilities of the main contractor & subcontractors, subcontractors' qualification and experience, bid shopping, project manager relationship & experience, communication, market position, construction productivity, collaboration.

The literatures showed that the subcontractors' management system application in the construction project has proved to be efficient and economical in addition to performing the works more quickly and at lesser cost.

CHAPTER 3 . RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the methodology which used in this research. The methodology includes information about the research design, population, sample size, data collection, questionnaire design, questionnaire content, instrument validity, pilot study, and the method of data processing and analysis, In addition, the limitations of the research survey. The questionnaire was the main approach to collect data and perspectives of the respondents.

The purpose of any research is to discover answers to questions through the application of scientific procedures. In line with this and as stated in Chapter 1, the main purpose of this research is to improve the management of construction projects through improving the management of subcontractors.

3.2 Research study

The differentiation of directions and goals of topic as shown previously, required different methodologies. The main methodologies obtained from literature review were: questionnaire survey, interviewing, case studies and modeling. Figure 3.1 shows summary of methodology used in this research. This research consists of six phases;

1. The first phase of the research included a summary about the comprehensive literature review in order to support the survey methodology. Literature on CSFs affecting on the management and performance of the subcontractors in the construction industry in the Gaza Strip were reviewed.
2. The second phase of the research focused on developing the questionnaire. This questionnaire was used to collect the required data in order to achieve the research objectives.
3. The third phase of the research was pilot study. The experts, contractors, engineers and subcontractors were contacted. The purpose of the pilot study is to prove that the questionnaire questions are clear to be answered in a way help to achieve the target of the questionnaire. In addition, it was important to ensure that all the information received from the contractors and subcontractors would be useful in achieving the research objectives. The questionnaire was modified based on the results of the pilot study.
4. The fourth phase of the research was data collection. One hundred and thirty five questionnaires were distributed to the research population but one hundred and thirteen were received.
5. The fifth phase of the research was the data analysis. Statistical software (SPSS) was used to perform the required analysis. Figure 3.1 shows the methodology flowchart, which leads to achieve the research objectives.
6. The last phase of the research included the conclusions and recommendations.

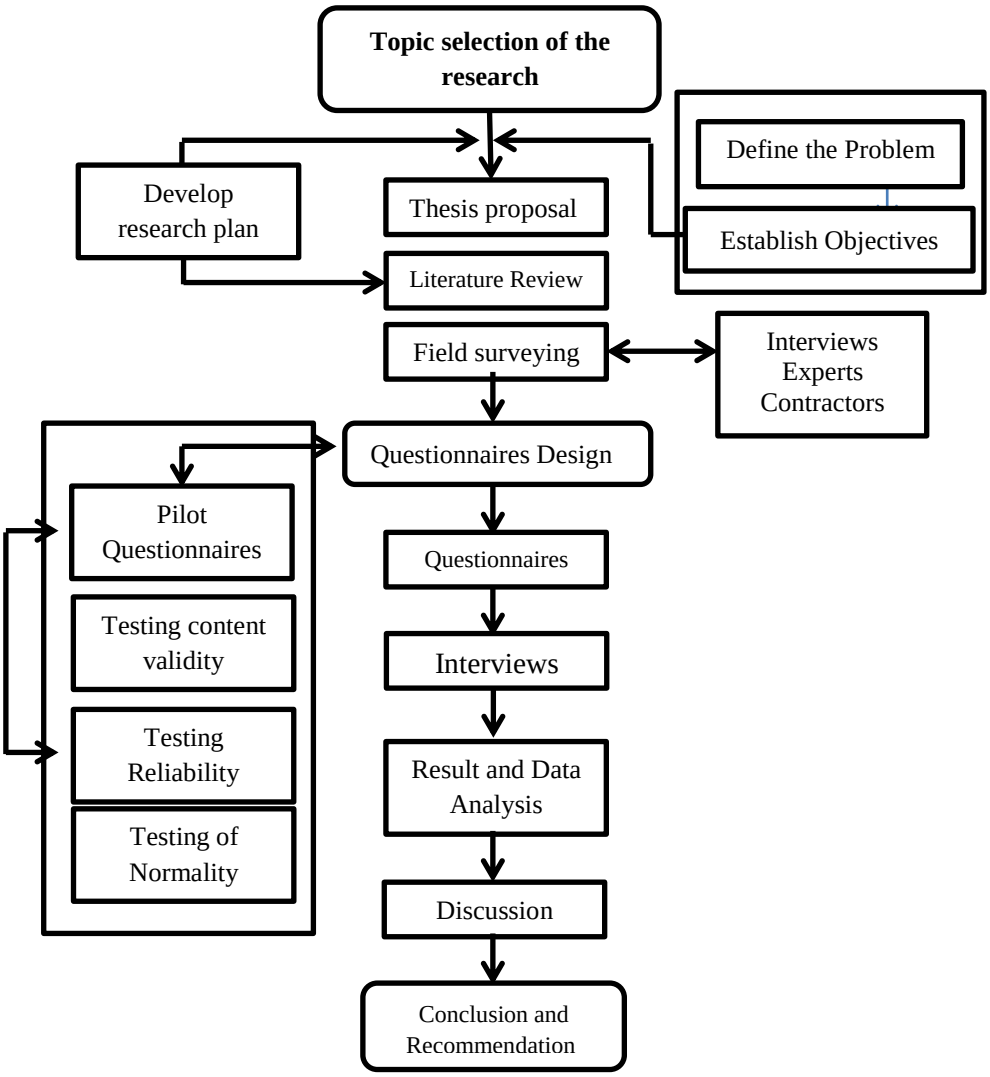

Figure 3.1: Flow chart of research methodology

3.3 Research strategy

Research strategy can be defined as the way in which the research objectives can be questioned. There are two types of research strategies, namely, "quantitative research" and "qualitative research". Deciding on which type of research to follow, depends on the purpose of the study and the type and availability of the information which is required (Naoum, 2007).

Fellows and Liu (2008) stat that quantitative approaches seek to gather information focuses on describing a phenomenon across a larger number of participants and to study relationships between facts and how such facts and relationships accord with theories and the findings of any research executed previously. This approach surveys a large number of individuals and applies statistical techniques to recognize overall patterns in the relations of processes. In the other hand qualitative approaches seek to gain insights and to understand people's perceptions research idea. In qualitative research, the beliefs,

understandings, opinions, views etc. of people are investigated – the data gathered may be unstructured. This is generally done in interviews, open-ended questions, or focus groups. In most cases, a small number of participants participate in this type of research, because to carry out such a research endeavor requires many resources and much time.

Analyses of qualitative data tend to be considerably more difficult than with quantitative data, often requiring a lot of filtering, sorting and other 'manipulations' to make them suitable for analytic techniques.
In this research, the quantitative approach was selected to collect the factual, perceptive and an attitude of the respondents about the CSFs that affecting on the subcontractors management in the construction industry in the Gaza Strip.

The field survey aims at collecting the data required to accomplish the research objectives. In this research a close-ended questionnaire and interviews were applied and distributed to collect data from the studied population.

3.4 Research population

A population consists of the totality of the observation with which it should be concerned. This research targeted, as studied population, firstly some main contractors in the Gaza Strip who classified under the first, second and third classes in the various types of work fields by the PCU. The contractors that are registered under the fourth and fifth classes were neglected due to the low practical and administrative experience of their companies in construction works. The studied population was the companies that have a valid registration in the PCU in the fields of buildings, roads, water and sewage, electro-mechanics and public works.

According to the PCU, the total number of the registered contractors until the 20th of October 2014 was 283. One hundred and thirty three contractors were classified under the third, fourth and fifth classes, while nearly 150 contractors were classified under first, second and third classes.

The second population included the subcontractors in the various types of work fields like (Shuttering, building, plastering, tiling, painting, mechanical, electrical, aluminum, carpentry and ironmongery). Unfortunately, there are no official reports showing the exact number of subcontractors in Gaza, since they are not represented by any union or association and because of the limited number of efficient subcontractors and lack of educational level of them, approximately number of subcontractors nearly 50 was taken in the research population.

It is worth mentioning that research focused only on the contractors and subcontractors perspective related subcontractors management success factors. The owners and supervisors perspective was not investigated in this research in order to increase the sample size of the contractors which represented the studied population.

3.5 Sample size

The objective of sampling is to provide a practical means of enabling the data collection and processing components of research to be carried out whilst ensuring that the sample provides a good representation of the population.

Statistical equations were used in order to calculate the sample size for each population of contractors and subcontractors, Equation 3.1 equation was used to determine the sample size of the unlimited population (Fellows and Liu, 2008).

$$n_f = \frac{n_s}{1+n_s/p} \qquad \text{(Equation 3.1)}$$

Where: n_f is the final sample size

P is the size of the population (150 contractors and 50 subcontractors).

$$n_s = \frac{t^2 \times (p)(q)}{e^2} \qquad \text{(Equation 3.2)}$$

The definitions of all variable can be defined as the following:

(p) (q) is the estimate of the variance, suggest p = q = 0.5 for dichotomous variables where the population, reasonably, is expected to be divided equally).

t = t Value (e.g. 1.96 for 95% confidence interval).
e = Maximum error of estimation (0.074).

The sample size for the contractors' and subcontractors' population can be calculated from the previous equations as follows:

$$n_s = \frac{1.96^2 \times (0.5 * 0.5)}{0.074^2} = 175$$

$$n_{contractors} = \frac{175}{1 + \frac{175}{150}} \cong 80 \quad contractors$$

$$n_{sub-contractors} = \frac{175}{1 + \frac{175}{50}} \cong 38 \; subcontractors$$

The targeted sample, which were selected according to equation 3.1 are 80 contractors and 38 subcontractors. One hundred and thirty five questionnaires were distributed, 113 respondents returned the questionnaires. 110 of the received questionnaires were fully completed so they were accepted to the analysis tests, while 3 questionnaires were neglected due to the uncompleted information.

According to the PCU registration, each contractor can be classified in more than one field of work with one class in each field. So, one contractor can be classified under the first class in one field, the second class in another field and under the third class in third field. So it is difficult to prepare a complete separation to the contractors according to their classes for various fields of works.

Categorical random sampling was used to represent the total sample size, since it is the most basic of the probability plans. First, all the target contractors were distributed randomly according to the classes to construct three groups with three classes; first, second and third classes. Then the sample had chosen randomly from the three groups according to its percentage of the total target population number, and the same thing done for subcontractors that chosen randomly.

Fortunately, the response rate was 90% for contractors and 71% for subcontractors as shown in Table 3.1.

Table 3.1 : Sample size and response rate of the study populations

Population Category	Total Population	Calculated Sample Size	Distributed questionnaire	Number of respondents	Response Rate
Contractors	150	80	90	81	90%
Subcontractors	50	38	45	32	71%

Moser and Kalton (1971) showed that a response rate of less than 30% is likely to produce results subject to non-response bias. Based on this, the obtained response rates of 90% and 71% are reasonable and will reflect good results and outputs (cited in Tayah, 2009).

3.6 Research location

The research was carried out in the Gaza Strip, and targeted the main contractors and subcontractors distributed all over Gaza Strip as shown in Table 3.2 below:

Table 3.2 : Geographical distribution of the sample.

Group	North	Gaza	Middle Area	South	Total
Contractors	8	55	9	9	81
Subcontractors	2	17	1	12	32

3.7 Data collection methodology

In order to collect the needed data for this research, the secondary resources can used in collecting data such as books, journals, statistics and web pages, in addition to preliminary resources that not available in secondary resources through interviews and

distribute questionnaires on study population in order to get their opinions about the critical success factor affecting on the subcontractors' management in the construction industry in the Gaza Strip. Research methodology depends on the analysis of data on the use of descriptive analysis, which depends on the poll and use the main program (SPSS).

3.7.1 Interviews

Semi-structured interviews were conducted by ten experts from main contractors and subcontractors. It used open and closed-ended questioning but the questions are not asked in a specific order and no schedule is used.

The task is to discover as much as possible about the specific issues related to your subject area (Naoum, 2007). Semi-structured interviews allow exploring the views and opinions with experts about issues concerned in more details about the CSFs affecting on the subcontractors' management.

Qualified experts who have deep understanding of the topic from contractors and subcontractors were selected based on two main criteria:

- The experts must possess adequate knowledge in the area of subcontractors' management.
- The experts have a high practical experience in the construction industry, especially in the subcontractors' management.

General questions have been prepared to explore local practices of subcontractors' management, and provide a descriptive background and real information of all aspects of technical, economic, financial, social, political, and legal factors related to subcontractors' management in the construction industry in the Gaza Strip. The general questions posed to interviews reviewed below:

1. What are the most CSFs affecting on the subcontractors management in the construction projects in the Gaza Strip related to:
    - Factors related to project's issues or General conditions surrounding the project.
    - Factors related to contract documents & management
    - Factors pertaining to project manager
    - Factors related to main contractors
    - Factors related to subcontractors
2. Put your opinion about impact of the subcontractors management related to factors of cost and time of the project?
3. Put your opinion about the barriers for the good performance of subcontractor's team in the construction project?

3.7.2 Questionnaire design

The questionnaire design was excerpted from previous studies related to the subject of this research as Arslan et al. (2008), Cheng et al. (2011), Ng and Tang (2010), Ng et al. (2008) and Pheng and Chuan (2006) and others, and after interviewing experts who are

dealing with the subject at different levels. All the information that could help in achieving the study objectives, were collected, reviewed and formalized to be suitable for the study survey.

The following is a questionnaire content:

1. The first section contained general information about the population (contractors and subcontractors).
2. The second section studied the success factors affecting on the subcontractors management and it contained six subtitle as follow:
    - The first subtitle was about factors related to project's issues;
    - The second subtitle was about factors related to content documents and management;
    - The third subtitle was about factors pertaining to project staff in general;
    - The fourth subtitle was about factors pertaining to project manager;
    - The fifth subtitle was about factors related to main contractors;
    - The sixth subtitle was about factors related to subcontractors.
3. The third section studied the effect of subcontractors' management in saving the project cost and time.
4. The forth section was about the barriers for the good performance of subcontractor's team and to find the critical factors lead to bad performance of the subcontractors.

The content of the initial questionnaire can be checked by contacting experts specialized in various fields related to the study subject. The contacted experts introduced general comments for the whole questionnaire and special comments for each main item in the questionnaire.

The general comments of the whole questionnaire are collected and listed:

- Questionnaire should be started with a cover page.
- The first part of questionnaire should be general information about the organization.
- Some parts like part four should be added in the questionnaire in order to achieve the required objectives of the study.
- Subcontractors' category should be added as a respondent of questionnaire.
- Some factors and sentences should be modified in order to give more clear meaning and understanding.
- Some factors and sentences should be modified or represented with more details
- Some local factors should be added as recommended by local experts, which affect the performance of construction projects in the Gaza Strip.
- Some factors were repeated more than one time with the same meaning. So, it should be to eliminate these repeated factors .
- Increasing the rating range of occurrence evaluation degree from three to five.
- Some factors should be rearranged in order to give more suitable and consistent meaning.
- Some of factors related to consultant should be added.

- There are some questions which are not practical or realistic with respect to situations of construction projects. Such these questions should be removed or modified to realistic and practical situations of Gaza Strip.
- Re-distribution of items between question groups.

Collected special comments and modifications of the experts and supervisor for the questionnaire will be presented systematically according to the questionnaire sections as follows:

Section one: General information

Detailed questions were quoted and used with essential modifications to meet the research objectives. Some modifications occur for this section through the repetitive review with the supervisor. Other modifications also can occur through the validity stage for the questionnaire by local experts working in various fields. The collected comments, which were presented on company profile, were as follows:

- Adding new item such as:
  - ✓ location of the company
  - ✓ number of the fixed term management employees in the company
  - ✓ staff of the subcontractors
- Re-formulation of some questions
- Re-arrangement of questions
- And spell checking for some sentences and words

Section two: Subcontractors management success factors

This section aimed to achieve the first and fourth objectives that intend to identify and rank the most common success factors affecting on subcontractors management in construction industry, and to propose recommendations to improve subcontractors' management. Several previous studies were used to selected the factors in this section such as: as Arslan et al. (2008), Cheng et al. (2011), Ng and Tang (2010), Ng et al. (2008) and Pheng and Chuan (2006), Arditi and Chotibhongs (2005), Ng et al. (2009) and Enshassi et al. (2008).

In depth review for some construction contracts, getting notes from experts who has experience in the field works, private experience about project life cycle, and a discussion with the supervisor led to settle the management success factors under the six groups.

A draft questionnaire with 73 management success factors under the six groups as shown in Table 3.3 were collected from literature studies mentioned and was detailed in chapter 2. After a discussion with the supervisor, many factors were amended and others were added, and others were reallocating from group to group, while some were neglected from the list in order to match (best fit) the nature of the construction industry in the Gaza Strip.

Table 3.3: Initial list of success management factors of subcontractors from previous studies

Factors from literature review	Status	Selected factors after pilot study
1- Factors related to Project's Issues		
1.1. The presence of the project in a densely populated place	Selected	The presence of the project in a densely populated place
1.2. The difficulty of implementing of the project life cycle	Modified	Project life cycle schedule is a deliberate and difficult implementation
1.3. The project is large and complex	Modified	Large/complex project
1.4. Increase the additional work for the project from the limit set in the contract	Selected	Increase the additional work for the project from the limit set in the contract
1.5. Remote location (difficult accessibility to the site)	Selected	Remote location (difficult accessibility to the site)
1.6. There is no contingency budget to proceed works	Selected	There is no contingency budget to proceed works
1.7. Increasing the fundamental changes in the nature of works	Selected	Increasing the fundamental changes in the nature of works
1.8. Many execution obstacles	Selected	Many execution obstacles
1.9.	Added	Government policy, market condition & political Situation
2- Factors related to contract Documents & management		
.1 Implementing the lowest bid price system	Selected	Implementing the lowest bid price system
.2 Selection of subcontractors through competitive strategy & taking the lowest price without taking into account any other criteria	Modified	Selection of subcontractors through competitive strategy & taking the lowest price as the only criteria for selection
.3 Subcontractors should help main contractors in tender pricing	Modified	Assisting the main contractors in pricing the tender by the subcontractors
.4 It is preferred the subcontractors to be company register in contractors union	Modified	The subcontractors is preferred to be company registered in contractors union
.5 Clear understanding of the contract conditions and requirements, project objectives and implementation methods by the contractors and subcontractors	Selected	Clear understanding of the contract conditions and requirements, project objectives and implementation methods by the contractors and subcontractors
.6 The clarity of the contract between contractors and subcontractors	Selected	The clarity of the contract between contractors and subcontractors
.7 Delays in the adoption of change orders	Selected	Delays in the adoption of change orders
.8 Compliance with regulations by the contractors & subcontractors	Selected	Compliance with regulations by the contractors & subcontractors
.9 Adherence to subcontract requirements	Selected	Adherence to subcontract requirements
.10	Added	Quality and clarity of design drawing and shop drawings
.11 Payment method to the main contractor by the client	Selected	Payment method to the main contractor by the client
.12 Insurance terms, Interest rate and bond/loan terms	Selected	Insurance terms, Interest rate and bond/loan terms
.13 The application of quality system in the project	Modified	The extent of application of quality system in the project

Table 3.3: Continued...

Factors from literature review	Status	Selected factors after pilot study
3- Factors pertaining to project staff in general		
3.1 The lack of the efficiency, qualification and skills of the project team	Selected	The lack of the efficiency, qualification and skills of the project team
3.2 Morally support the project staff	Selected	Morally support the project staff
3.3 Preparation training courses for the project staff to work on-site	Modified	Preparation of training courses qualify the project staff to work on-site
3.4 Number of craftsmen and laborers in the project	Selected	Number of craftsmen and laborers in the project
3.5 Qualified supervisory staff	Selected	Qualified supervisory staff
3.6	Added	Collaboration between the staff of the project
4- Factors pertaining to project manager		
4.1 Manager personality & his experience	Selected	Manager personality & his experience
4.2 Salary of the managers	Selected	Salary of the managers
4.3 Management level leadership	Selected	Management level leadership
4.4 Regular and effective communication & coordination with main contractor and subcontractors by the project manager	Selected	Regular and effective communication & coordination with main contractor and subcontractors by the project manager
4.5 Managers should realize the other construction activities related to subcontractors tasks to ensure the continuity of the work of subcontractors and ensuring not to conflicting and project's delayed	Modified	Managers should realize the other construction activities related to subcontractors tasks to ensure the continuity of the work of subcontractors
4.6 Coordination between all subcontractors working in the same project	Selected	Coordination between all subcontractors working in the same project
4.7 Ability to undertake the size of work by the project manager	Selected	Ability to undertake the size of work by the project manager
4.8 Monitor subcontractors' process to ensure they are doing things according to plan and method statements	Modified	Monitor subcontractors' work process to ensure they are doing things according to plan and method statements.
4.9	Added	Project manager should obtain written approval from consultant for any work before start
5- Factors related to main contractors		
5.1 Previous experience, history and reputation of the main contractors	Selected	Previous experience, history and reputation of the main contractors
5.2 Practical and technical ability of the main contractors	Selected	Practical and technical ability of the main contractors
5.3 Contractors performance of relevant previous projects	Selected	Contractors performance of relevant previous projects
5.4 Financial ability & strength of the main contractors	Selected	Financial ability & strength of the main contractors
5.5 Ability in dealing with uncertainty in the construction projects	Selected	Ability in dealing with uncertainty in the construction projects
5.6 Effective communication between contractors and subcontractors	Deleted	

Table 3.3: Continued...

Factors from literature review	Status	Selected factors after pilot study
5.7 Financial facilitation to subcontractors to be able to purchase the materials and equipment	Selected	Financial facilitation to subcontractors to be able to purchase the materials and equipment
5.8 Main contractor should give a subcontractors management work plan before start the work	Selected	Main contractor should give a subcontractors management work plan before start the work
5.9 Providing subcontractors location services and work requirements which depends upon the execution of project's works (electricity-water- scaffolding-cranes safety Belt …. etc.	Modified	Providing subcontractors location services and work requirements
5.10 Make sure that the subcontractors' price fit quality specifications	Modified	Make sure that the subcontractors' price fit to quality and specifications
5.11 Main contractors work as in project schedule	Modified	Commitment of the main contractors with project schedule
5.12 The way of material and equipment's procurement of the project	Deleted	
5.13 Bearing responsibility in case of accidents	Selected	Bearing responsibility in case of accidents
5.14 Relationship with subcontractor/client/ consultant	Selected	Relationship with subcontractor/client/consultant
5.15 Ability in bearing the risk in case payment delay from the client	Selected	Ability in bearing the risk in case payment delay from the client
5.16 Company's management system	Deleted	
5.17 Delayed payment to subcontractors	Deleted	
5.18 Controlling and follow up of subcontractors activities by main contractor's engineers	Selected	Controlling and follow up of subcontractors activities by main contractor's engineers
5.19	Added	Lack of trust between main contractors and subcontractors
5.20 Close control over the cost by the contractors	Deleted	
6- Factors related to subcontractors		
6.1 Size of subcontractors' staff	Selected	Size of subcontractors' staff
6.2 Previous experience, history and reputation of the subcontractors	Selected	Previous experience, history and reputation of the subcontractors.
6.3 Practical and technical ability of the subcontractors	Selected	Practical and technical ability of the subcontractors
6.4 Financial ability & strength of the subcontractors	Selected	Financial ability & strength of the subcontractors
6.5 Performance of relevant previous projects	Selected	Performance of relevant previous projects
6.6 Subcontractor familiarity with the nature of the required tests for its own work and materials supplied by him	Selected	Subcontractor familiarity with the nature of the required tests for its own work and materials supplied by him
6.7 Subcontractor's ability to arrange and coordinate its work for the project and any external business	Deleted	
6.8 Subcontractor work in isolation from the main project activities and considered that he is solely responsible for the own actions & consequences	Deleted	

Table 3.3: Continued...

Factors from literature review	Status	Selected factors after pilot study
6.9 The extent of the subcontractor's commitment to the specifications and quality of the project	Selected	The extent of the subcontractor's commitment to the specifications and quality of the project
6.10 The extent of the subcontractor's commitment to the project's schedule	Selected	The extent of the subcontractor's commitment to the project's schedule
6.11 Close control over the cost by the subcontractors	Selected	Close control over the cost by the subcontractors
6.12 Natural and specialty of subcontractor	Deleted	
6.13 Prompt payment to laborers	Selected	Prompt payment to laborers
6.14	Added	Providing adequate information/conditions to main contractor
6.15 Material wastage control	Deleted	
6.16 Subcontractor's ability to dominate and control of the duration of his task	Deleted	
6.17 Compliance with regulations by subcontractors	Deleted	

Section three: The effect of subcontractors' management in saving the project cost and time

This section aimed to achieve the third objective that intends to investigate the effect of subcontractors' management in saving the project cost and time in construction project. A draft of nine factors as shown in table 3.4 was collected from literature studies mentioned and were detailed in chapter 2. After discussion with supervisor, some factors were amended and others were added, while some were neglected from the list in order to match (best fit) the nature of the construction industry in the Gaza Strip.

Table 3.4: Initial list of subcontractors' management factors related to project cost and time

Factors from literature review	Status	Selected factors after pilot study
1. Profit rate of project	Modified	Profit rate of project for subcontractors and contractors
2. Material and equipment cost	Selected	Material and equipment cost
3. Project labor cost	Selected	Project labor cost
4. Waste rate of materials	Selected	Waste rate of materials
5. Cost of variation orders	Selected	Cost of variation orders
6. Planned time for project construction	Selected	Planned time for project construction
7. Time needed to implement variation orders	Selected	Time needed to implement variation orders
8.	Added	Time needed to rectify defects
9.	Added	Overhead percentage of project

Section four: The barriers for the good performance of subcontractor's team

This section aimed to achieve the second objective of the research that intended to investigate the critical factors affect subcontractor good performance in construction project in the Gaza strip. In the draft questionnaire, sixteen factors as shown in Table 3.4 were collected from literature studies mentioned and were detailed in chapter 2. After a discussion with the supervisor, many factors were amended and others were added, while some were neglected from the list in order to match (best fit) the nature of the construction industry in the Gaza Strip.

Table 3.5: Initial list of factors affect the subcontractors' good performance

Factors from literature review	Status	Selected factors after pilot study
1. The duration that allocated for the subcontractor's activities commensurate with the size of work	Selected	The duration that allocated for the subcontractor's activities commensurate with the size of work
2. Construction technique	Modified	Lack of good construction technique
3. Salary for workers of subcontractor's team	Modified	Low salary for workers of subcontractor's team
4. The price of the subcontractor's contract and low percentage of the profit	Modified	Low price of the subcontractor's contract and low percentage of the profit
5. Collaboration between project staff	Modified	Bad collaboration between project staff
6. Number of experienced site supervisory staff	Modified	Low number of experienced site supervisory staff
7. Religion motivation for workers in subcontractor's team	Deleted	
8. Compliance with general and contractual obligation	Modified	Weak compliance with general and contractual obligation
	Added	Bad communication between contractors and subcontractors
9. The safety approach used by site manager and their effect on safety performance	Modified	No safety approach used by site manager
10. Facilitate the arrivals of subcontractor's team to the project site	Modified	No facilitate the arrivals of subcontractor's team to the project site
11. Familiarity of work and location	Modified	Unfamiliarity of work and location
12. Subcontractor having the required equipment to finish his work	Modified	Lack of subcontractor equipment to finish his work
13. Clean working environment	Modified	Unsuitable working environment
14. Safe working environment	Modified	Unsafe working environment
15.	Added	Non ability to control duration

After many stages of discussion, consulting, amending, and reviewing executed by the researcher with the supervisor, the research questionnaire was finalized and became ready for distribution. The questionnaire design was composed of four sections to accomplish the aim of this research. For each section, all related factors found in the literature and previous studies were collected and reviewed. After that, the factors were deleted, modified, merged or selected. Also, some new factors were added according to the results and recommendations of the pilot study.

Full detailed information will be demonstrated in the next section. The survey questionnaire was conducted to determine the point of view of the studied population sample regarding the CSFs for subcontractors' management. Six pages questionnaire accompanied with a covering letter. The covering letter explained the aim of the research. A close-ended questionnaire was used for its advantages. These advantages are such as it is easy to ask and quick to answer, they require no writing by either respondents or interviewer.

3.8 Data measurement

In order to be able to select the appropriate method of analysis, the level of measurement must be understood. For each type of measurement, there is/are an appropriate method/s that can be applied and not others. The researcher used Likert quintuple criterion to measure and examine the answers of questionnaire questions. The answers were limited to the following classifications: Ordinal scale is a ranking or rating data that normally uses integers in ascending or descending order. The numbers assigned to the agreement or degree of influence (1, 2, 3, 4, 5) don't indicate that the interval between scales are equal, nor do they indicate absolute quantities. They are merely numerical labels; only ordinal scale was used in this research as illustrated in the Table 3.6 (Brinkman, 2009).

Table 3.6: Likert scale of evaluation

Classificatior	Very high Important	High Important	Moderate Important	Low Important	Very low Important
Degree	5	4	3	2	1

The survey questionnaire was prepared in English language (Annex 1) due to the fact that most of literature studies and researches were in English, but for the interest of this research and to have more accurate results the questionnaire was translated into Arabic (Annex 2), as most of the studied population cannot use English. An academic supervisor also reviewed the Arabic version in order to achieve as much accuracy as possible.

3.9 Pilot study

A pilot study for the questionnaire 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.

Pilot study of the questionnaire is achieved by a scouting sample, which consisted of ten questionnaires. These questionnaires were distributed to expert engineers such as projects managers, site engineers/office engineers and organizations managers to review the questionnaire and verify the validity of the questionnaire topics and its relevance to the research objective and give their advice. They have a strong practical experience in construction industry field. Their sufficient experience are a suitable indication for pilot study. Experts' comments and suggestions were collected to be evaluated carefully. All the suggested comments and modifications were discussed with the study's supervisor before taking into consideration. By ending this step, the questionnaire was finalized and became ready for distribution.

The piloting stage served to increase the effectiveness of the questionnaire. Items that had weak reliability were either deleted or combined.

3.9.1 Validity of questionnaire

Validity refers to the degree to which an instrument measures what it is supposed to be measuring. Validity has a number of different aspects and assessment approaches. Statistical validity is used to evaluate instrument validity, which include internal validity and structure validity.

3.9.1.1 Questionnaire internal validity

Brinkman (2009) stated that content validity addresses the question whether the full content of a construct is represented in the measure or are some dimensions left out. Internal validity of the questionnaire is the first statistical test that used to test the validity of the questionnaire. It is measured by a scouting sample, which consisted of 20 questionnaires through measuring the correlation coefficients between each item in one field and the whole field.

Table (3.7) clarifies the correlation coefficient for each item of the "Factors related to project's issues" and the total of the field. The p-values (Sig.) are less than 0.05, so the correlation coefficients of this field are significant at $\alpha = 0.05$, so it can be said that the items of this field are consistent and valid to be measure what it was set for.

Table 3.7: Correlation coefficient of each items of "Factors related to project's issues" and the whole field

No.	Item	Pearson Correlation Coefficient	P-Value (Sig.)
1.	The presence of the project in a densely populated place	0.529	0.000*
2.	Project life cycle schedule is a deliberate and difficult implementation	0.716	0.000*
3.	Large/complex project	0.692	0.000*
4.	Increase the additional work for the project from the limit set in the contract	0.513	0.000*

Table 3.7: Continued…

5.	Remote location (difficult accessibility to the site)	0.683	0.000*
6.	There is no contingency budget to proceed works	0.645	0.000*
7.	Increasing the fundamental changes in the nature of works	0.614	0.000*
8.	Many execution obstacles	0.741	0.000*
9.	Government policy, market condition & political situation	0.654	0.000*

* Correlation is significant at the 0.05 level

Table (3.8) clarifies the correlation coefficient for each item of the "Factors related to contract documents & management" and the total of the field. The p-values (Sig.) are less than 0.05, so the correlation coefficients of this field are significant at $\alpha = 0.05$, so it can be said that the items of this field are consistent and valid to be measure what it was set for.

Table 3.8: Correlation coefficient of each item of "Factors related to contract documents & management" and the total of this field

No.	Item	Pearson Correlation Coefficient	P-Value (Sig.)
1.	Implementing the lowest bid price system	0.612	0.000*
2.	Selection of subcontractors through competitive strategy & taking the lowest price as the only criteria for selection	0.592	0.000*
3.	Assisting the main contractors in pricing the tender by the subcontractors	0.473	0.000*
4.	The subcontractors id preferred to be company registered in contractors union	0.404	0.000*
5.	Clear understanding of the contract conditions and requirements, project objectives and implementation methods by the contractors and subcontractors	0.727	0.000*
6.	The clarity of the contract between contractors and subcontractors	0.692	0.000*
7.	Delays in the adoption of change orders	0.533	0.000*
8.	Compliance with regulations by the contractors & subcontractors	0.589	0.000*
9.	Adherence to subcontract requirements	0.714	0.000*
10.	Quality and clarity of design drawing and shop drawings	0.570	0.000*
11.	Payment method to the main contractor by the client	0.658	0.000*
12.	Insurance terms, interest rate and bond/loan terms	0.459	0.000*
13.	The extent of application of quality system in the project	0.573	0.000*

* Correlation is significant at the 0.05 level

Table (3.9) clarifies the correlation coefficient for each item of the "Factors pertaining to project staff in general" and the total of the field. The p-values (Sig.) are less than 0.05, so the correlation coefficients of this field are significant at $\alpha = 0.05$, so it can be said that the items of this field are consistent and valid to be measure what it was set for.

Table 3.9: Correlation coefficient of each item of "Factors pertaining to project staff in general "and the total of this field

No.	Item	Pearson Correlation Coefficient	P-Value (Sig.)
1.	The lack of the efficiency, qualification and skills of the project team	0.626	0.000
2.	Morally support the project staff	0.663	0.000
3.	Preparation of training courses qualify the project staff to work on-site	0.736	0.000
4.	Number of craftsmen and laborers in the project	0.782	0.000
5.	Qualified supervisory staff	0.749	0.000
6.	Collaboration between the staff of the project	0.774	0.000

* Correlation is significant at the 0.05 level

Table (3.10) clarifies the correlation coefficient for each item of the "Factors pertaining to project manager" and the total of the field. The p-values (Sig.) are less than 0.05, so the correlation coefficients of this field are significant at $\alpha = 0.05$, so it can be said that the items of this field are consistent and valid to be measure what it was set for.

Table 3.10: Correlation coefficient of each item of "Factors pertaining to project manager" and the total of this field

No.	Item	Pearson Correlation Coefficient	P-Value (Sig.)
1.	Manager personality & his experience	0.760	0.000*
2.	Salary of the managers	0.692	0.000*
3.	Management level leadership	0.738	0.000*
4.	Regular and effective communication & coordination with main contractor and subcontractors by the project manager	0.769	0.000*
5.	Managers should realize the other construction activities related to subcontractors tasks to ensure the continuity of the work of subcontractors	0.761	0.000*
6.	Coordination between all subcontractors working in the same project	0.606	0.000*
7.	Ability to undertake the size of work by the project manager	0.706	0.000*

Table 3.10: Continued…

8.	Monitor subcontractors' work process to ensure they are doing things according to plan and method statements	0.705	0.000*
9.	Project manager should obtain written approval from consultant for any work before start	0.644	0.000*

* Correlation is significant at the 0.05 level

Table (3.11) clarifies the correlation coefficient for each item of the "Factors related to main contractors" and the total of the field. The p-values (Sig.) are less than 0.05, so the correlation coefficients of this field are significant at $\alpha = 0.05$, so it can be said that the items of this field are consistent and valid to be measure what it was set for.

Table 3.11: Correlation coefficient of each item of "Factors related to main contractors" and the total of this field

No.	Item	Pearson Correlation Coefficient	P-Value (Sig.)
1.	Previous experience, history and reputation of the main contractors	0.667	0.000*
2.	Practical and technical ability of the main contractors	0.706	0.000*
3.	Contractors performance of relevant previous projects	0.750	0.000*
4.	Financial ability & strength of the main contractors	0.601	0.000*
5.	Ability in dealing with uncertainty in the construction projects	0.511	0.000*
6.	Controlling and follow up of subcontractors activities by main contractor's engineers	0.730	0.000*
7.	Financial facilitation to subcontractors to be able to purchase the materials and equipment	0.645	0.000*
8.	Main contractor should give a subcontractors management work plan before start the work	0.589	0.000*
9.	Providing subcontractors location services and work requirements	0.745	0.000*
10.	Make sure that the subcontractors' price fit to quality and specifications	0.708	0.000*
11.	Commitment of the main contractors with project schedule	0.731	0.000*
12.	Ability in bearing the risk in case payment delay from the client	0.604	0.000*
13.	Bearing responsibility in case of accidents	0.604	0.000*
14.	Relationship with subcontractor/client/consultant	0.653	0.000*
15.	Lack of trust between main contractors and subcontractors	0.519	0.000*

* Correlation is significant at the 0.05 level

Table (3.12) clarifies the correlation coefficient for each item of the "Factors related to subcontractors" and the total of the field. The p-values (Sig.) are less than 0.05, so the correlation coefficients of this field are significant at $\alpha = 0.05$, so it can be said that the items of this field are consistent and valid to be measure what it was set for.

Table 3.12: Correlation coefficient of each item of "Factors related to subcontractors" and the total of this field

No.	Item	Pearson Correlation Coefficient	P-Value (Sig.)
1.	Size of subcontractors' staff	0.702	0.000*
2.	Previous experience, history and reputation of the subcontractors	0.752	0.000*
3.	Practical and technical ability of the subcontractors	0.777	0.000*
4.	Financial ability & strength of the subcontractors	0.758	0.000*
5.	Performance of relevant previous projects	0.761	0.000*
6.	Subcontractor familiarity with the nature of the required tests for its own work and materials supplied by him.	0.686	0.000*
7.	The extent of the subcontractor's commitment to the specifications and quality of the project	0.680	0.000*
8.	The extent of the subcontractor's commitment to the project's schedule	0.613	0.000*
9.	Close control over the cost by the subcontractors	0.616	0.000*
10.	Prompt payment to labourers	0.734	0.000*
11.	Providing adequate information/conditions to main contractor	0.613	0.000*

* Correlation is significant at the 0.05 level

Table (3.13) clarifies the correlation coefficient for each item of the "The effect of subcontractors' management in saving the project cost and time" and the total of the field. The p-values (Sig.) are less than 0.05, so the correlation coefficients of this field are significant at $\alpha = 0.05$, so it can be said that the items of this field are consistent and valid to be measure what it was set for.

Table 3.13: Correlation coefficient of each item of "The effect of subcontractors management in saving the project cost and time" and the total of this field

No.	Item	Pearson Correlation Coefficient	P-Value (Sig.)
1.	Profit rate of project	0.696	0.000*
2.	Material and equipment cost	0.779	0.000*
3.	Project labor cost	0.690	0.000*
4.	Waste rate of materials	0.743	0.000*
5.	Cost of variation orders	0.652	0.000*
6.	Planned time for project construction	0.706	0.000*
7.	Time needed to implement variation orders	0.731	0.000*
8.	Time needed to rectify defects	0.732	0.000*
9.	Overhead percentage of project	0.718	0.000*

* Correlation is significant at the 0.05 level

Table (3.14) clarifies the correlation coefficient for each item of the "The barriers for the good performance of subcontractor's team" and the total of the field. The p-values (Sig.) are less than 0.05, so the correlation coefficients of this field are significant at $\alpha = 0.05$, so it can be said that the items of this field are consistent and valid to be measure what it was set for.

Table 3.14: Correlation coefficient of each item of "The barriers for the good performance of subcontractor's team" and the total of this field

No.	Item	Pearson Correlation Coefficient	P-Value (Sig.)
1.	The duration that allocated for the subcontractor's activities commensurate with the size of work	0.481	0.000*
2.	Lack of good construction technique	0.494	0.000*
3.	Low salary for workers of subcontractor's team	0.318	0.000*
4.	Low price of the subcontractor's contract and low percentage of the profit	0.660	0.000*
5.	Bad collaboration between project staff	0.676	0.000*
6.	Low number of experienced site supervisory staff	0.458	0.000*
7.	Weak compliance with general and contractual obligation	0.720	0.000*
8.	Bad communication between contractors and subcontractors	0.746	0.000*
9.	No safety approach used by site manager	0.768	0.000*

Table 3.14: Continued…

10.	No facilitate the arrivals of subcontractor's team to the project site	0.723	0.000*
11.	Lack of subcontractor equipment to finish his work	0.726	0.000*
12.	unfamiliarity of work and location	0.701	0.000*
13.	Unsuitable working environment	0.542	0.000*
14.	Unsafe working environment	0.607	0.000*
15.	Non ability to control duration	0.697	0.000*

* Correlation is significant at the 0.05 level

3.9.1.2 Structure validity of the questionnaire

Statistically, to ensure the validity of the questionnaire; and to be sure that the objective of each item is to achieve the main aim of the questionnaire. Structure validity test was applied. Structure validity is the 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.

Table (3.15) showed the correlation coefficient for each field and the whole questionnaire. The p-values (Sig.) are less than 0.05, so the correlation coefficients of all the fields are significant at $\alpha = 0.05$, 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.

Table 3.15: Correlation coefficient of each field and the whole of questionnaire

No.	Field	Pearson Correlation Coefficient	P-Value (Sig.)
1.	Factors related to project's issues	0.689	0.000*
2.	Factors related to contract documents & management	0.866	0.000*
3.	Factors pertaining to project staff in general	0.764	0.000*
4.	Factors pertaining to project manager	0.886	0.000*
5.	Factors related to main contractors	0.924	0.000*
6.	Factors related to subcontractors	0.844	0.000*
Sec. 2	Subcontractors management success factors	0.964	0.000*
Sec. 3	The effect of subcontractors management in saving the project cost and time	0.691	0.000*
Sec. 4	The barriers for the good performance of subcontractor’s team	0.704	0.000*

* Correlation is significant at the 0.05 level

3.9.2 Questionnaire reliability

This section presents test of reliability of questionnaire according to the pilot study. The reliability of an instrument is the degree of consistency which measures the attribute; it is supposed to be measuring. 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 used to test the stability of answers for a scouting sample of respondents by filling the questionnaire two times with a time lag from 2 to 4 weeks and then compares the scores obtained by computing a reliability coefficient (George and Mallery, 2003).

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. The Cronbach's coefficient alpha was calculated for each field of the questionnaire.

Table (3.16) shows the values of Cronbach's Alpha for each field of the questionnaire and the entire questionnaire. For the fields, values of Cronbach's Alpha were in the range from 0.797 and 0.960. This range is considered high; the result ensures the reliability of each field of the questionnaire. Cronbach's Alpha equals 0.960 for the entire questionnaire which indicates an excellent reliability of the entire questionnaire.

Table 3.16: Cronbach's Alpha for each field of the questionnaire

No.	Field	Pearson Correlation Coefficient
1.	Factors related to project's issues	0.797
2.	Factors related to contract documents & management	0.836
3.	Factors pertaining to project staff in general	0.822
4.	Factors pertaining to project manager	0.873
5.	Factors related to main contractors	0.886
6.	Factors related to subcontractors	0.889
Sec. 2	Subcontractors management success factors	0.960
Sec. 3	The effect of subcontractors management in saving the project cost and time	0.885
Sec. 4	The barriers for the good performance of subcontractor's team	0.893
	All items of the questionnaire	0.960

The Thereby, it can be said that the researcher proved that the questionnaire was valid and reliable, and ready for distribution for the population sample.

3.10 Data processing and analysis

The collected raw data was first sorted, edited, coded and then entered into computer software. Two programs were used, the Excel sheet and SPSS software. 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 ascending 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.

3.10.1 Test of normality

In order to recognize whether or not the data obtained by the questionnaire can be categorized under the normal distribution. The Normal Distribution Test (Kolmogrov-Smirnov Z) was used to decide which type of statistical tests can be used to analyze the collected data either by the parametric tests or the non-parametric tests. If the calculated value of significance is more than 0.05, then the collected data are of normal distribution and all the parametric tests can be applied. The tabulated value of Z is taken at significance value (p-value) equal 0.05 (means 95% confidence interval with 5% as confidence level).

Table (3.17) shows the results for Kolmogorov-Smirnov test of normality. Each calculated value of Z is less than the corresponding tabulated value of Z. Furthermore, the value of significance (p-value) for each field is more than 0.05, and then the distribution for each field is normally distributed. Consequently, parametric tests will be used to perform the statistical data analysis.

Table 3.17: Kolmogorov-Smirnov test

No.	Field	Kolmogorov-Smirnov	
		Statistic (Z)	P-Value (Sig.)
1.	Factors related to project's issues	1.221	0.101
2.	Factors related to contract documents & management	1.105	0.174
3.	Factors pertaining to project staff in general	0.983	0.289
4.	Factors pertaining to project manager	1.066	0.080
5.	Factors related to main contractors	1.345	0.054
6.	Factors related to subcontractors	0.901	0.392
Sec. 2	Subcontractors management success factors	1.387	0.053
Sec. 3	The effect of subcontractors management in saving the project cost and time	1.208	0.108
Sec. 4	The barriers for the good performance of subcontractor's team	0.879	0.422
	All items of the questionnaire	1.066	0.206

3.10.2 Statistical analysis tools

The researcher would use data analysis both qualitative and quantitative data analysis methods. The Data analysis will be made utilizing (SPSS 22). The researcher would utilize the following statistical tools:

1) Kolmogorov-Smirnov test of normality.
2) Pearson correlation coefficient for Validity.
3) Cronbach's Alpha for Reliability Statistics.
4) Frequency and Descriptive analysis.
5) Parametric Tests (One-sample T test, Independent Samples T-test and Analysis of Variance).

The parametric the parametric tests such as: One Sample T Test, Correlation tests, etc. can be used. The main parametric test, which is the One Sample T Test, conditioned three cases to determine the attitude of the respondents towards CSFs for subcontractors' management in construction projects in the Gaza strip, these cases are:

- If the p-value is less than 0.05 and the calculated T-value is larger than the positive tabulated T-value, it can be inferred that the respondents' opinions are positive. This means that the respondents are in agreement with the item content. (**p-value** < 0.05, **T** > +1.98)
- If the p-value is less than 0.05 and the calculated T-value is less than the negative tabulated T-value, it can be inferred that the respondents' opinions are negative. This means that the respondents are not in agreement with item content. (**p-value** < 0.05, **T** < -1.98)
- If the level of significance is more than 0.05 and the calculated T-value is between -1.98 and +1.98, it can be inferred that the respondents' opinions are neutral regarding the item content. (**α** > 0.05, -1.98 < **T** < +1.98). Neutral position means that the respondent is between the agreement and the refusal of item content. It is like a person who has not clear position or strict decision.

The One- Way Analysis of Variance (ANOVA) is used to examine if there is a statistical significant difference between several means among the respondents toward the CSFs for Subcontractors management in Construction projects in the Gaza strip due to (Classification Category of the Company, Years of experience of the company, Location of the company, Position of the person filling the questionnaire, Years of experience of the person filling the questionnaire, Number of fixed-term management employees in the company, Number of fixed-term workers and technicians in the company, Specialty of Subcontractor, Location of the subcontractor's Company, Years of experience of the subcontractor and Staff of the Subcontractor).

CHAPTER 4 . DATA ANALYSIS AND DISCUSSION

This chapter describes the methodology that was used in this research and introduces the survey results obtained from interviews and questionnaire and the discussion of the questionnaire's sections for the contractors and subcontractors. Interviews results obtained from ten interviews with experts from contractors and subcontractors companies. Questionnaire results obtained from 113 questionnaires.

Section one of the questionnaire presented the main contractor's company and subcontractors profile and all necessary information about the respondents. Section two was designed to achieve the first and fourth objectives that intend to identify and rank the most common success factors affecting on subcontractors management in construction industry in the Gaza Strip, and to propose recommendations to improve subcontractors' management. Section three was designed to achieve the third objective that intended to investigate the effect of subcontractors' management in saving the project cost and time in construction project, and to propose recommendations for solving these problems. Section four was designed to achieve second objective that intended to investigate the critical factors affect subcontractor good performance in construction project in the Gaza strip.

4.1 Questionnaire results

4.1.1 Section one: General information

4.1.1.1 General information about the main contractors

This section includes seven questions that ask about the nature of the company, years of experience of the company, location of the company, position of the person filling the questionnaire, years of experience of the person filling the questionnaire, number of fixed-term management employees in the company and number of fixed-term workers and technicians in the company.

A. Classification of contractors

Table 4.1 shows the number and percentage of contractors' categories according to classification of PCU. It is shown that 75.3% (61) from the companies sample classified in the first category, 21.0% (17) of the companies sample classified in the second category and 3.7% (3) of the companies sample classified in the third category, this results increases the credibility and reliability of the results.

B. Years of experience of the company

Concerning the company experience, Table 4.1 illustrates the frequency of companies responded to the questionnaire. 8.6% from the companies have years of experience less than 5 years, 24.7% from the companies have years of experience 5-10 years, 18.5% from the companies have years of experience 11-15 years and 48.1% from the companies have years of experience more than 15 years.

Based on the previous statistics, it can be inferred that a lot of target contractors have experience between medium to long term. Therefore, the points of view of the surveyed persons are expected to be convergent. This range of experience gives them the ability to manage subcontractors effectively and provide accurate and reliable information to the questionnaire.

C. Location of the company

Table 4.1 shows the distribution of the study sample according to location. 9.9% (8) of the companies located in the north of Gaza, 67.9% (55) of the companies located in Gaza, 11.1% (9) of the companies located in the middle area and 11.1% (9) of the companies located in the south of Gaza. Because the majority of contracting companies are from Gaza governorate, it can be expected that a good convergence for the point of views of companies is expected.

D. Position of the person filling the questionnaire

Table 4.1 illustrates the number and percentage of respondents according to the position of the person filling the questionnaire. It is shows that 22.2% (18) of the sample are project manager, 12.3% (10) of the sample are office engineer, 60.5% (49) of the sample are site engineer, 3.7% (3) of the sample are company's owner and 1.2% (1) of the sample has other position.

These results indicated that many persons filling the questionnaire, 82.7 % of the respondents were site engineers and project managers. Due to this result, it can be inferred that accuracy in the collected data will be expected.

E. Years of experience of the person filling the questionnaire

According to the respondent's experience, Table 4.1 illustrates that 28.4% of the respondents have years of experience less than 5 years", 40.7% of the respondents have years of experience 5-10 years, 14.8% of the respondents have years of experience 11-15 years and 16.0% of the respondents have years of experience more than 15 years. This result emphasizes the accuracy of the obtained data which can lead to accurate results.

F. Number of fixed-term management employees in the company

Table 4.1 shows the number and percentage of respondents according to number of fixed-term management employees in the company. It shows that 28.4% of the surveyed contracting companies have number of fixed-term management employees less than 5 employees, 51.9% of them have 5-10, 11.1% of them have 11-15 and 8.6% of them have more than 15 fixed-term management employees, these results mean that the majority of contracting companies do not have sufficient number of fixed term management employees which negatively affects the subcontractors' management.

G. Number of fixed-term workers and technicians in the company

From table 4.1, it is shown that 14.8% of the surveyed contracting companies have number of fixed-term workers and technicians less than 5 employees, while 45.7% of surveyed contracting companies have 5-10 employees, 14.8% of them have 11-15 employees and 24.7% of surveyed contracting companies have more than 15 fixed-term workers and technicians.

This is evidence that the majority of contracting companies are a small size. This means that contracting companies depend on hiring subcontractors in the construction projects. Therefore subcontracts hiring may affect the point view of contractors towards the success factor affecting on subcontractors management.

Table 4.1: General information about the main contractors

General information about the main contractors	Percent %
A. Classification of contractors	
Category 1	75.3%
Category 2	21.0%
Category 3	3.70%
B. Years of experience of the company	
More than 15 years	48.1%
11-15 years	18.5%
5-10 years	24.7%
less than 5 years	8.60%
C. Location of the company	
North of Gaza	10.0%
Gaza	67.9%
Middle area	11.0%
South of Gaza.	11.0%
D. Position of the person filling the questionnaire	
Project manager	22.2%
Office engineer	12.3%
Site engineer	60.6%
Company's owner	3.70%
Other position	1.20%
E. Years of experience of the person filling the questionnaire	
less than 5 years	28.4%
5-10 years	40.7%
11-15 years	14.8%
more than 15 years	16.0%
F. Number of fixed-term management employees in the company	
less than 5	28.4%
5-10	51.9%
11-15	11.1%
more than 15	8.60%
G. Number of fixed-term workers and technicians in the company	
less than 5 workers	14.8%
5-10 workers	45.7%
11-15 workers	14.8%
more than 15 workers	24.7%

4.1.1.2 General Information about the subcontractors

This section includes seven questions that ask the respondents about the specialty of subcontractor, location of the subcontractors, years of experience of the subcontractors and staff of the subcontractors. The answers of the subcontractors respondents presented in table 4.2 as shown below.

A. Specialty of subcontractor

Table 4.2 shows the number and percentage of subcontractors respondents according to specialty of subcontractor. It shows that 12.5% of the sample (Subcontractor) have a specialty 'Shuttering', 9.4% of the sample have a specialty 'Building', 15.6% of the sample have a specialty 'Plastering', 3.1% of the sample have a specialty 'Tiling',12.5% of the sample have a specialty 'Painting', 12.5% of the sample have a specialty 'Mechanic', 9.4% of the sample have a specialty 'Electrical' and 25.0% of the sample have another specialty such as lifts companies, Qudsi Stone and glazed reinforcement concrete (GRC).

These results indicated the diversity of information given from the respondents which can lead to correct and accurate results.

B. Location of the subcontractor's company

Figure 4.2 shows the distribution of the study sample according to location, the sample size respondents' number consists of 6.3% of the subcontractor's company located in the north of Gaza, 53.1% of them located in Gaza, 3.1% of them located in the middle area and 37.5% of them located in the south of Gaza. Because the majority of contracting companies are from Gaza governorate, it can be expected that a good convergence for the point of views of companies is expected.

C. Years of experience of the subcontractor

Concerning the company experience, table 4.2 illustrates the frequency of companies responded to the questionnaire. 6.3% of the respondents had experience less than 5 years, 6.3% of the respondents had experience from 5 to less than 10 years, 18.8% of the respondents had experience from 11to less 15 years and 68.8% of the respondents were having experience more than 15 years.

These results indicate that a lot of target subcontractors have long term experience. This range of experience gives them the ability to manage workers effectively and provide accurate and reliable information to the questionnaire.

And it shows that there is no significant difference in the point of view of contractors in regard to the subcontractors' management that can be attributed to the years of experience of contracting companies.

D. Staff of the subcontractor

Table 4.2 shows the number and percentage of subcontractors according to number of Staff. 40.6 % of the sample (subcontractors) have a staff between '5-10' workers, 21.9 % of them have a staff between '11-15' workers and 37.5% of them have 'more than 15' workers. It is concluded that a lot of the subcontractors in the Gaza Strip depend on a small team of experienced workers to finish the works.

Table 4.2: General information about the subcontractors

General information about the subcontractors	Percent %
A. Specialty of subcontractor	
Shuttering	12.5%
Building	9.40%
Plastering	15.6%
Tiling	3.10%
Painting	12.50%
Mechanic	12.50%
Electrical	9.40%
Other	25.0%
B. Location of the subcontractor's company	
North of Gaza	6.30%
Gaza	53.1%
Middle area	3.10%
South of Gaza.	37.5%
C. Years of experience of the subcontractor	
less than 5 years	6.30%
5-10 years	6.30%
11-15 years	18.8%
more than 15 years	68.8%
D. Staff of the subcontractor	
less than 5 workers	0%
5-10 workers	40.0%
11-15 workers	22.0%
more than 15 workers	37.0%

4.1.2 Section two: Subcontractors management success factors

This part shows the results of the responding contractors and subcontractors regarding six groups of factors (total 63 factors) used for determining the CSFs affecting on the subcontractors management in the construction project in the Gaza Strip.

Group 1) Factors related to project's issues
Group 2) Factors related to contract documents & management
Group 3) Factors pertaining to project staff in general
Group 4) Factors pertaining to project manager
Group 5) Factors related to main contractors
Group 6) Factors related to subcontractors

4.1.2.1 Factors related to project's issues

Table 4.3 and 4.4 shows the opinion of respondents (contractors and subcontractors) about the factors related to project's issues according to relative importance index ranked from high to low.

Table 4.3 shows the results of the main contractors' responses. The mean of factor 1 "Government policy, market condition & political situation" equals 3.99 (79.75%), Test-value = 7.74, and P-value = 0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this factor is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to this factor.

Table 4.3: Means and test values for "Factors related to project's issues" for contractors

Item	Mean	Proportional mean (%)	Test value	P-value (Sig.)	Rank
Government policy, market condition & political situation	3.99	79.75	7.74	0.000*	1
Project life cycle schedule is a deliberate and difficult	3.81	76.25	6.59	0.000*	2
Many execution obstacles	3.76	75.19	6.41	0.000*	3
Increasing the fundamental changes in the nature of works	3.72	74.43	5.91	0.000*	4
Large/complex project	3.68	73.67	5.75	0.000*	5
There is no contingency budget to proceed works	3.61	72.25	4.66	0.000*	6
Increase the additional work for the project from the limit set in the	3.43	68.50	3.74	0.000*	7
Remote location (difficult accessibility to the site)	3.22	64.36	1.53	0.065	8
The presence of the project in a densely populated place	3.19	63.80	1.38	0.085	9
All items of the field	3.60	72.03	7.14	0.000*	

* The mean is significantly different from 3

The lowest important factor is "The presence of the project in a densely populated place" which has a mean equals 3.19 (63.80%), Test-value = 1.38, and P-value = 0.085 which is greater than the level of significance $\alpha = 0.05$. Then the mean of this factor is insignificantly different from the hypothesized value 3. It is concluded that the respondents (Do not know, neutral) to this factor.

The mean of the group "Factors related to project's issues" equals 3.60 (72.03%), Test-value = 7.14, and P-value=0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this group is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to group of "Factors related to project's issues ".

Table 4.4: Means and test values for "Factors related to project's issues" for subcontractors responses

Item	Mean	Proportional mean (%)	Test value	P-value (Sig.)	Rank
Government policy, market condition & political situation	3.94	78.71	3.75	0.000*	1
Increasing the fundamental changes in the nature of works	3.81	76.13	3.95	0.000*	2
Many execution obstacles	3.70	74.00	3.10	0.002*	3
Project life cycle schedule is a deliberate and difficult implementation	3.69	73.75	3.67	0.000*	4
There is no contingency budget to proceed works	3.69	73.75	3.39	0.001*	4
Large/complex project	3.42	68.39	2.14	0.020*	6
Increase the additional work for the project from the limit set in the	3.19	63.75	0.81	0.211	7
The presence of the project in a densely populated place	3.16	63.23	0.87	0.196	8
Remote location (difficult accessibility to the site)	2.78	55.63	-0.93	0.181	9
All items of the field	3.49	69.74	3.95	0.000*	

* The mean is significantly different from 3

Table 4.4 shows the results of the subcontractors' responses: The mean of factor "Government policy, market condition & political situation" equals 3.94 (78.71%), Test-value = 3.75 and P-value = 0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this factor is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to this factor.

The lowest important factor is "Remote location (difficult accessibility to the site) which has a mean equals 2.78 (55.63%), Test-value = -0.93, and P-value = 0.181 which is greater than the level of significance $\alpha = 0.05$. Then the mean of this factor is insignificantly different from the hypothesized value 3. It is concluded that the respondents (Do not know, neutral) to this factor.

The mean of the group "Factors related to project's issues" equals 3.49 (69.74%), Test-value = 3.95, and P-value=0.000 which is smaller than the level of significance $\alpha = 0.05$.The sign of the test is positive, so the mean of this group is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to group of "Factors related to project's issues ".

From Table 4.3 and 4.4, it is shown that, "Government policy, market condition & political situation" was ranked in the first position by both the contractors and subcontractors with a mean value of (3.99) and (3.94) respectively. This emphasizes that, these are the most important factors in this group that related to project's issues that affecting on the subcontractors' management in the construction projects and this is because of the nature of the political and economic situation of the Gaza Strip during the continued closer of the crossings and Israeli attacks with different shapes: therefore the construction projects may be destroyed partially or totally by these events. This hard political situation lead to unemployed most of the subcontractors, therefore the management of them in such case will be difficult because it will take in the account, the bad social status of the workers.

On the other hand, it is shown that, The responding contractors ranked "Project life cycle schedule is a deliberate and difficult" as the second most important factors that affecting the subcontractors' management with a mean value of 3.81, otherwise it was ranked in the fourth position by the responding subcontractors with a mean value of 3.69.

The importance of this factor was because the clarity of the project schedule lead to minimize disputes between the contractor and sub-contractor and between the main contractors and the supervisor or client, and thus lead to facilitate the management of sub-contractors in the project. The research results of Wang and Liu (2005) are coincide with this result that the schedule control in the construction project is important because any even small variations in the duration of critical or near-critical paths directly affect the duration of the project.

While "Increasing the fundamental changes in the nature of works" was ranked by the responding subcontractors as the second most important factor affecting on the subcontractors management in the construction project in the Gaza Strip with a mean value of 3.81, this is because of that the increasing of the fundamental changes lead to rework and lead to increase the cost of the work, thus may effect on the management of the subcontractors that hate the reworks and may make problems with main contractors.

On the other hand, the responding contractors and subcontractors agreed that "Many execution obstacles" was ranked in the third position of the importance of the factors that affecting on the subcontractors' management with a mean value of (3.76) and (3.7) respectively, this mean that obstacles faced by the contractors and subcontractors during the implementation phase of the project effect negatively on the management of the subcontractors in the project, because this obstacles will delay the subcontractors activities and thus increase the subcontractors' activities cost, so finally the absence of obstacles to implementation of the project facilitate the process of subcontractors' management in the construction project in the Gaza strip.

Finally, it shown that, "The presence of the project in a densely populated place" was ranked in the last position by responding contractor with a mean value of 3.19. Otherwise "Remote location (difficult accessibility to the site)" was ranked by the responding subcontractor in the last position of the importance of the factors that affecting on the subcontractors' management. This means that these factors does not effect on the subcontractors' management in the construction project in the Gaza Strip.

Table 4.5 below review the most fourth ranked factors that affecting on the subcontractors management in construction industry that related to project's issues in the perspectives of the contractors and corresponding factors for subcontractors.

Table 4.5: Rank and mean for "Factors related to project's issues"

	Item	Contractors Respondent		Subcontractors Respondent	
		Mean	Rank	Mean	Rank
1	Government policy, market condition & political situation	3.99	1	3.94	1
2	Project life cycle schedule is a deliberate and difficult	3.81	2	3.69	4
3	Many execution obstacles	3.76	3	3.70	3
4	Increasing the fundamental changes in the nature of works	3.72	4	3.81	2

4.1.2.2 Factors related to contract documents & management

Table 4.6 shows the results of the main contractors: The mean of factor "Quality and clarity of design drawing and shop drawings" equals 4.03 (80.51%), Test-value = 8.78 and P-value = 0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this factor is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to this factor.

The lowest important factor is "The subcontractors is preferred to be company registered in contractors union" which has a mean equals 3.06 (61.27%), Test-value = 0.44, and P-value = 0.330 which is greater than the level of significance $\alpha = 0.05$. Then the mean of this factor is insignificantly different from the hypothesized value 3. It is concluded that the respondents (Do not know, neutral) to this factor.

The mean of the group "Factors related to contract documents & management" equals 3.64 (72.74%), Test-value = 8.37, and P-value=0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this group is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to this group.

Table 4.6: Means and test values for "Factors related to contract documents & management" for contractors

Item	Mean	Proportional mean (%)	Test value	P-value (Sig.)	Rank
Quality and clarity of design drawing and shop drawings	4.03	80.51	8.78	0.000*	1
Payment method to the main contractor by the client	3.96	79.24	8.10	0.000*	2
The clarity of the contract between contractors and subcontractors	3.94	78.75	8.10	0.000*	3
Clear understanding of the contract conditions and requirements, project objectives and implementation methods by the contractors and subcontractors	3.85	77.00	6.75	0.000*	4
Selection of subcontractors through competitive strategy & taking the lowest price as the only criteria for selection	3.73	74.50	5.35	0.000*	5
Implementing the lowest bid price system	3.67	73.42	5.03	0.000*	6
Compliance with regulations by the contractors & subcontractors	3.65	73.00	6.35	0.000*	7
Delays in the adoption of change orders	3.61	72.15	5.44	0.000*	8
Adherence to subcontract requirements	3.60	71.95	5.78	0.000*	9
Assisting the main contractors in pricing the tender by the subcontractors	3.56	71.14	4.38	0.000*	10
The extent of application of quality system in the project	3.44	68.72	3.95	0.000*	11
Insurance terms, interest rate and bond/loan terms	3.13	62.56	0.90	0.184	12
The subcontractors preferred to be company registered in the contractors union	3.06	61.27	0.44	0.330	13
All items of the field	3.64	72.74	8.37	0.000*	

* The mean is significantly different from 3

Table 4.7 shows the results of the subcontractors' responses: the mean of factor "The clarity of the contract between contractors and subcontractors" equals 4.58 (91.61%), Test-value = 10.38 and P-value = 0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this factor is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to this factor.

The lowest important factor is "Insurance terms, interest rate and bond/loan terms" which has a mean equals 3.13 (63.23%), Test-value = 0.66, and P-value = 0.258 which is greater than the level of significance $\alpha = 0.05$. Then the mean of this factor is insignificantly different from the hypothesized value 3. It is concluded that the respondents (Do not know, neutral) to this factor.

The mean of the group "Factors related to contract documents & management" equals 3.99 (79.85%), Test-value = 16.14, and P-value=0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this group is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to this group.

Table 4.7: Means and test values for "Factors related to contract documents & management" for subcontractors

Item	Mean	Proportional mean (%)	Test value	P-value (Sig.)	Rank
The clarity of the contract between contractors and subcontractors	4.58	91.61	10.38	0.000*	1
Payment method to the main contractor by the client	4.44	88.75	10.16	0.000*	2
Adherence to subcontract requirements	4.39	87.74	10.15	0.000*	3
Quality and clarity of design drawing and shop drawings	4.34	86.88	9.65	0.000*	4
Clear understanding of the contract conditions and requirements, project objectives and implementation methods by the contractors and subcontractors	4.32	86.45	11.28	0.000*	5
Implementing the lowest bid price system	4.10	81.94	5.24	0.000*	6
The extent of application of quality system in the project	4.00	80.00	8.42	0.000*	7
Selection of subcontractors through competitive strategy & taking the lowest price as the only criteria for selection	3.90	78.06	4.21	0.000*	8
Delays in the adoption of change orders	3.81	76.25	3.82	0.000*	9
Assisting the main contractors in pricing the tender by the subcontractors	3.80	76.00	3.69	0.000*	10
Compliance with regulations by the contractors & subcontractors	3.75	75.00	3.56	0.001*	11
The subcontractors id preferred to be company registered in contractors union	3.29	65.81	1.16	0.128	12
Insurance terms, interest rate and bond/loan terms	3.16	63.23	0.66	0.258	13
All items of the field	3.99	79.85	16.14	0.000*	

* The mean is significantly different from 3

From Table 4.6, it is concluded that, "Quality and clarity of design drawing and shop drawings" was ranked in the first position by the contractors' respondent with a mean value of (4.03). This emphasizes that, this is the most important factor in this group that affecting on the subcontractors' management in the construction projects.

Sometimes the site is handed over to contractor while the drawings of the project are incomplete, so the consultant should complete these drawing before start the work. In some occasions, the consultant may complete the drawings gradually, according to the priorities of activities. For the two cases, the project is delayed and effect negatively on the project management specially subcontractors. Therefore the design team should complete the drawings before the tendering phase in the best case and should be clear and covering all items normally expected or required in the project. This result is supported by the results obtained of Daoud (1999) which said; generally, designers put most of their effort into the design stage to produce detailed drawings. Little effort is put into preparing specifications or into coordinating them with the drawings and bills of quantities (BoQs). And result is also agreed with the result of Ogunlana et al (1996) that incomplete drawing is one of important causes of delay.

On the other hand as shown in table 4.7 that, "The clarity of the contract between contractors and subcontractors" was ranked in the first important factor that affecting on the subcontractors' management by the subcontractors respondent with a mean value of (4.58) but this same factor was ranked in the third position of the importance of the factors that affecting on the subcontractors' management with a mean value of (3.94) by the contractor respondent, This means that the contract can be considered as the main source of disputes, because the contract is the main document that describes the legal relation between the contract parties. Any bias in the contract terms in favor of one party to the other will lead to conflict and disputes, so that contract must be clear in all construction project not only for enhancing subcontractors' management but for all issues related to construction in general and for subcontractors in particular, so as to avoid the problems and dilemmas that may occur in the future between all parties to the project that affect negatively on the management of the subcontractors in the project.

On the other hand, the responding contractors and subcontractors agreed that "Payment method to the main contractor by the client" was ranked in the second position of the importance of the factors that affecting on the subcontractors' management with a mean value of (3.96) and (4.44) respectively, this importance come from the delay of the payment from client to contractors may effect on the payment from the main contractors to subcontractors specially if the main contractor have not strong financial capacity and this may also lead to disputes and claims between owner and contractor and between all projects parties. All of that will affect negatively the overall performance of project and then effect negatively on the management of subcontractors. This result is in line with Arditi and Chotibhongs (2005) and Enshassi et al (2009) that timeliness of payments from owners affects many subcontractors, for whom receiving delayed payments from their general contractors that receive delayed payment from the owner is a cause of friction between the two parties and affects the project's performance.

On the other hand, as shown in table 4.7, that the responding subcontractors ranked "Adherence to subcontract requirements" in the third position of the importance factors that affecting on the subcontractors' management. The adherence to the subcontract

requirements by contractor and subcontractor facilitate the management of the subcontractors in the construction industry. This result is in line with Enshassi et al (2010) that adherence of the subcontractor to contract terms is one of the important factors used by main contractors for selection of suitable subcontractors thus it enhance the subcontractors' management in the construction project.

Table 4.8 below review the sixth most important factors that affecting on the subcontractors management in construction industry in the Gaza Strip that related to contract documents & management in the point of views of the contractors and corresponding factors for subcontractors. It is clear that the two respondent contractors and subcontractors agreed in most of the factors affecting on subcontractors' management.

Table 4.8: Rank and mean of factors for "Factors related to contract documents & management"

Item	Contractors Respondent		Subcontractors Respondent	
	Mean	Rank	Mean	Rank
Quality and clarity of design drawing and shop drawings	4.03	1	4.34	4
Payment method to the main contractor by the client	3.96	2	4.44	2
The clarity of the contract between contractors and subcontractors	3.94	3	4.58	1
Clear understanding of the contract conditions and requirements, project objectives and implementation methods by the contractors and subcontractors	3.85	4	4.32	5
Selection of subcontractors through competitive strategy & taking the lowest price as the only criteria for selection	3.73	5	3.9	8
Implementing the lowest bid price system	3.67	6	4.1	6

4.1.2.3 Factors pertaining to project staff in general

Table 4.9 shows the results of the main contractors: The mean of factor "The lack of the efficiency, qualification and skills of the project team" equals 3.96 (79.23%), Test-value = 7.73, and P-value = 0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this factor is significantly greater than the hypothesized value 3. It is conclude that the respondents agree to this factor.

The lowest important factor is "Preparation of training courses qualify the project staff to work on-site" which has a mean equals 3.05 (61.01%), Test-value = 0.41, and P-value = 0.340 which is greater than the level of significance $\alpha = 0.05$. Then the mean of this factor is insignificantly different from the hypothesized value 3. It is conclude that the respondents (Do not know, neutral) to this factor.

The mean of the group "Factors pertaining to project staff in general" equals 3.64 (72.89%), Test-value = 7.54, and P-value=0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this group is significantly greater than the hypothesized value 3. It is conclude that the respondents agree to group of "Factors pertaining to project staff in general ".

Table 4.9: Means and test values for "Factors pertaining to project staff in general" for contractors

Item	Mean	Proportional mean (%)	Test value	P-value (Sig.)	Rank
The lack of the efficiency, qualification and skills of the project team	3.96	79.23	7.73	0.000*	1
Qualified supervisory staff	3.93	78.50	8.14	0.000*	2
Collaboration between the staff of the project	3.91	78.25	7.90	0.000*	3
Number of craftsmen and laborers in the project	3.62	72.41	5.64	0.000*	4
Morally support the project staff	3.40	68.00	3.26	0.001*	5
Preparation of training courses qualify the project staff to work on-site	3.05	61.01	0.41	0.340	6
All items of the field	**3.64**	**72.89**	**7.54**	**0.000***	

* The mean is significantly different from 3

Table 4.10 shows the results of the subcontractors' responses: The mean of factor "Qualified supervisory staff" equals 4.69 (93.75%), Test-value = 12.94, and P-value = 0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this item is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to this factor.

The lowest important factor is "Preparation of training courses qualify the project staff to work on-site" which has a mean equals 3.44 (68.75%), Test-value = 2.18, and P-value = 0.018 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this factor is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to this factor.

The mean of the group "Factors pertaining to project staff in general" equals 4.07 (81.35%), Test-value = 10.02, and P-value=0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this group is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to group of "Factors pertaining to project staff in general ".

Table 4.10: Means and test values for "Factors pertaining to project staff in general" for subcontractors responses

Item	Mean	Proportional mean (%)	Test value	P-value (Sig.)	Rank
Qualified supervisory staff	4.69	93.75	12.94	0.000*	1
Collaboration between the staff of the project	4.59	91.88	16.10	0.000*	2
The lack of the efficiency, qualification and skills of the project team	4.09	81.88	5.54	0.000*	3
Number of craftsmen and laborers in the project	3.88	77.50	5.46	0.000*	4
Morally support the project staff	3.72	74.38	3.86	0.000*	5
Preparation of training courses qualify the project staff to work on-site	3.44	68.75	2.18	0.018*	6
All items of the field	4.07	81.35	10.02	0.000*	

* The mean is significantly different from 3

From Table 4.9, it is shown that "The lack of the efficiency, qualification and skills of the project team" was ranked in the first position by contractors and ranked by subcontractors in the third position of the importance of the factors affecting on the subcontractors' management with a mean value of (3.96) (4.09) respectively. This mean that this factor is the most critical factor in the group of "Factors pertaining to project staff in general" in the point of view of contractors that affecting on the subcontractors' management in the construction projects in the Gaza Strip. The importance of this factor result from that the success of the management in any construction project depend on the qualification and skills of the project team, also the lack of it effect negatively on the performance and quality of the project which effect on the subcontractors' management.

On the another hand in the subcontractors respondent opinion that the "Qualified supervisory staff" is the first important factors affecting on the subcontractors' management with a mean value (4.69), but it ranked by the contractors in the second position with a mean value (3.93) as shown in table 4.9. The experience of the supervisory staff influence over the contractor and subcontractor's commitment to the drawings and specifications that lead to got the required quality and a good performance and make it easier for the main contractor in dealing with sub-contractors at the site. This result is in line with the result of Enshassi and Shoman (2008) that a close cooperation and mutual understanding between main contractors and supervisory staff can improve the efficiency and performance of the work and can minimize conflicts and disputes.

Otherwise as shown, "Collaboration between the staff of the project" was ranked by contractors in the third position of the importance factors affecting on the subcontractors management in construction industry in the Gaza Strip with a mean value (3.91) and ranked by subcontractors in the second position of the importance with a mean value (4.59). This result depicts the positive attitude of the contractor towards the owner to exert collaboration efforts to solve problems and disputes together in their early stages. And the collaboration between all project's parties effect on ending the project in the specified time and cost, as a result of all that the quality, performance and management of project in general and of subcontractors' team specially will improve. Akintan and Morledge (2013) is in line with this result that this factor is important in construction because there is yet a possibility for participants' main contractors and subcontracts in particular to collaborate and overcome problems occur in the project. Also the result of Enshassi et al (2009) and Eom et al (2008) is confirm this result that continuous coordination and collaborative relationship between project participants are required through the project life cycle in order to solve problems, to enhanced levels of cooperation and productivity and develop project performance.

Generally the two respondent contractors and subcontractors agree with the opinion in the most third important factors that affecting on the subcontractors' management in construction industry in the Gaza Strip that related to the group of "Factors pertaining to project staff in general" which is (The lack of the efficiency, qualification and skills of the project team, Qualified supervisory staff and Collaboration between the staff of the project) so we should give more attention to these factors to enhance the management of the subcontractors in the construction industry in Gaza.

4.1.2.4 Factors pertaining to project manager

Table 4.11 shows the results of the main contractors: The mean of factor "Manager Personality & his experience" equals 4.11 (82.25%), Test-value = 8.84, and P-value = 0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this factor is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to this factor.

The lowest important factor is "Coordination between all subcontractors working in the same project" which has a mean equals 3.65 (73.00%), Test-value = 5.63, and P-value = 0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this factor is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to this factor.

The mean of the group "Factors pertaining to project manager" equals 3.84 (76.77%), Test-value = 9.71, and P-value=0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this group is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to this group.

Table 4.11: Means and test values for "Factors pertaining to project manager" for contractors

Item	Mean	Proportional mean (%)	Test value	P-value (Sig.)	Rank
Manager personality & his experience	4.11	82.25	8.84	0.000*	1
Ability to undertake the size of work by the project manager	3.96	79.24	8.85	0.000*	2
Management level leadership	3.87	77.44	8.15	0.000*	3
Monitor subcontractors' work process to ensure they are doing things according to plan and method statements	3.86	77.25	7.50	0.000*	4
Managers should realize the other construction activities related to subcontractors tasks to ensure the continuity of the work of subcontractors	3.79	75.75	6.94	0.000*	5
Project manager should obtain written approval from consultant for any work before start	3.78	75.70	6.12	0.000*	6
Regular and effective communication & coordination with main contractor and subcontractors by the project manager	3.75	74.94	6.22	0.000*	7
Salary of the managers	3.73	74.50	6.08	0.000*	8
Coordination and cooperation between all subcontractors working in the same project	3.65	73.00	5.63	0.000*	9
All items of the field	3.84	76.77	9.71	0.000*	

* The mean is significantly different from 3

Table 4.12 shows the results of the subcontractors' responses: The mean of factor "Manager Personality & his/her experience" equals 4.59 (91.88%), Test-value = 13.55, and P-value = 0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this factor is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to this factor.

The lowest important factor is "Project manager should obtain written approval from consultant for any work before start" which has a mean equals 3.75 (75.00%), Test-value = 3.64, and P-value = 0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this factor is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to this factor.

The mean of the group "Factors pertaining to project manager" equals 4.20 (84.10%), Test-value = 19.45, and P-value=0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this group is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to this group.

Table 4.12: Means and test values for "Factors pertaining to project manager" for subcontractors responses

Item	Mean	Proportional mean (%)	Test value	P-value (Sig.)	Rank
Manager personality & his/her experience	4.59	91.88	13.55	0.000*	1
Managers should realize the other construction activities related to subcontractors tasks to ensure the continuity of the work of subcontractors	4.47	89.38	14.65	0.000*	2
Regular and effective communication & coordination with main contractor and subcontractors by the project manager	4.34	86.88	13.94	0.000*	3
Ability to undertake the size of work by the project manager	4.31	86.25	11.52	0.000*	4
Monitor subcontractors' work process to ensure they are doing things according to plan and method statements	4.16	83.13	9.66	0.000*	5
Management level leadership	4.13	82.50	7.31	0.000*	6
Salary of the managers	4.09	81.88	7.57	0.000*	7
Coordination between all subcontractors working in the same project	4.00	80.00	7.87	0.000*	8
Project manager should obtain written approval from consultant for any work before start	3.75	75.00	3.64	0.000*	9
All items of the field	4.20	84.10	19.45	0.000*	

* The mean is significantly different from 3

From Table 4.11 and 4.12, it is shown that, "Manager Personality & his/her experience" was ranked by both the contractors and subcontractors in the first position of the importance factors affecting on the subcontractors management in construction industry in the Gaza Strip with a mean value of (4.11) and (4.59) respectively. This emphasizes that; the project manager should have a strong personality and high practical experience to avoid any problem can happen in the project and to be able to solve it if happened. Since the success of any engineering project and success of the management of it depends largely on the personality and experience of the project manager. This result is supported by the result of Enshassi et al 2009 which it displayed that leadership skills for project manager affecting the performance of construction projects. And agree with Cheng et al (2011) that manager personality is important to assess subcontractor

performance and to select the proper subcontractors because selecting subcontractors properly, projects can attain higher degrees of management control and success.

On the other hand, as shown in table 4.11, that the responding contractors ranked the "Ability to undertake the size of work by the project manager" in the second position of the importance factors that affecting on the subcontractors' management with a mean value (3.96). Otherwise as shown in table 4.12, the subcontractors' responses ranked "Managers should realize the other construction activities related to subcontractors tasks to ensure the continuity of the work of subcontractors" in the second position of the importance factors affecting on the subcontractors management in construction industry in the Gaza Strip with a mean value (4.47).

Table 4.13 below review the fifth most important factors that affecting on the subcontractors management in construction industry that related to factors pertaining to project manager in the point of views of the contractors and corresponding factors for subcontractors, it is clear that the two respondent contractors and subcontractors is agree in some important factors that affecting on subcontractors' management.

Table 4.13: Rank and mean for "Factors pertaining to project manager"

Item	Contractors Respondent		Subcontractors Respondent	
	Mean	Rank	Mean	Rank
Manager personality & his/her experience	4.11	1	4.59	1
Ability to undertake the size of work by the project manager	3.96	2	4.31	4
Management level leadership	3.87	3	4.13	6
Monitor subcontractors' work process to ensure they are doing things according to plan and method statements	3.86	4	4.16	5
Managers should realize the other construction activities related to subcontractors tasks to ensure the continuity of the work of subcontractors	3.79	5	4.47	2

4.1.2.5 Factors related to main contractors

Table 4.14 shows the results of the main contractors' responses: The mean of factor "Financial ability & strength of the main contractors" equals 4.01 (80.25%), Test-value = 9.55 and P-value = 0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this factor is significantly greater than the hypothesized value 3. It is conclude that the respondents agree to this factor.

The lowest important factor is "Financial facilitation to subcontractors to be able to purchase the materials and equipment" which has a mean equals 3.51 (70.13%), Test-value = 3.98, and P-value = 0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this factor is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to this factor.

The mean of the group "Factors related to main contractors" equals 3.76 (75.29%), Test-value = 10.06, and P-value=0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this group is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to this group.

Table 4.14: Means and test values for "Factors related to main contractors" for contractors

Item	Mean	Proportional mean (%)	Test value	P-value (Sig.)	Rank
Financial ability & strength of the main contractors	4.01	80.25	9.55	0.000*	1
Practical and technical ability of the main contractors	3.99	79.75	9.89	0.000*	2
Contractors performance of relevant previous projects	3.94	78.75	8.62	0.000*	3
Previous experience, history and reputation of the main contractors	3.94	78.73	8.29	0.000*	4
Make sure that the subcontractors' price fits to quality and specifications	3.84	76.71	7.58	0.000*	5
Relationship with subcontractor /client/consultant	3.82	76.46	7.07	0.000*	6
Providing subcontractors location services and work requirements	3.77	75.38	8.28	0.000*	7
Bearing responsibility in case of accidents	3.75	74.94	6.60	0.000*	8
Controlling and follow up of subcontractors activities by main contractor's engineers	3.73	74.62	6.52	0.000*	9
Commitment of the main contractors with project schedule	3.71	74.18	5.86	0.000*	10
Ability in bearing the risk in case payment delay from the client	3.71	74.10	6.26	0.000*	11
Lack of trust between main contractors and subcontractors	3.65	72.91	4.97	0.000*	12
Main contractor should give a subcontractors management work plan before start the work	3.62	72.41	5.36	0.000*	13
Ability in dealing with uncertainty in the construction projects	3.54	70.75	5.11	0.000*	14
Financial facilitation to subcontractors to be able to purchase the materials and equipment	3.51	70.13	3.98	0.000*	15
All items of the field	3.76	75.29	10.06	0.000*	

* The mean is significantly different from 3

Table 4.15 shows the results of the subcontractors' responses: The mean of factor "Financial ability & strength of the main contractors" equals 4.59 (91.88%), Test-value = 12.66 and P-value = 0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this factor is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to this factor.

The mean of factor "Ability in dealing with uncertainty in the construction projects" equals 3.63 (72.50%), Test-value = 4.06, and P-value = 0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this item is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to this factor.

The mean of the group "Factors related to main contractors" equals 4.17 (83.43%), Test-value = 17.24, and P-value=0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this group is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to this group.

Table 4.15: Means and test values for "Factors related to main contractors" for subcontractors

Item	Mean	Proportional mean (%)	Test value	P-value (Sig.)	Rank
Financial ability & strength of the main contractors	4.59	91.88	12.66	0.000*	1
Make sure that the subcontractors' price fit to quality and specifications	4.53	90.63	15.28	0.000*	2
Previous experience, history and reputation of the main contractors	4.44	88.75	11.36	0.000*	3
Providing subcontractors location services and work requirements	4.38	87.50	10.35	0.000*	4
Financial facilitation to subcontractors to be able to purchase materials and equipment	4.34	86.88	8.11	0.000*	5
Main contractor should give a subcontractors management work plan before start the work	4.29	85.81	9.72	0.000*	6
Practical and technical ability of the main contractors	4.25	85.00	10.52	0.000*	7
Contractors performance of relevant previous projects	4.13	82.50	8.02	0.000*	8

Table 4:15. Continued…

Commitment of the main contractors with project schedule	4.13	82.50	7.02	0.000*	8
Relationship with subcontractor/client/consultant	4.06	81.25	8.40	0.000*	10
Lack of trust between main contractors and subcontractors	4.03	80.63	5.07	0.000*	11
Controlling and follow up of subcontractors activities by main contractor's engineers	4.03	80.63	9.02	0.000*	11
Ability in bearing the risk in case payment delay from the client	3.94	78.75	4.80	0.000*	13
Bearing responsibility in case of accidents	3.81	76.25	3.82	0.000*	14
Ability in dealing with uncertainty in the construction projects	3.63	72.50	4.06	0.000*	15
All items of the field	4.17	83.43	17.24	0.000*	

* The mean is significantly different from 3

From Table 4.14 and 4.15, it is shown that, "Financial ability & strength of the main contractors" was ranked in the first position by both the contractors and subcontractors' respondent with a mean value of (4.01) and (4.59) respectively. This emphasizes that, these are the most important factor in this group that related to main contractors that affecting on the subcontractors' management in the construction projects, it's because of the nature of the political and economic situation of Gaza that lead to delays in payment to main contractors, thus main contractors must have a good and a strong financial ability to be able to pay for workers for subcontractors and to be able to purchase materials and equipment, shortly to be able to finish the project correctly and on time.

This result comply with the result of Eom et al (2008) that the main contractor places primary importance on subcontractor service and financial stability to finish the work correctly and the best way. Also this result supported by the result of Arditi and Chotibhongs (2005) and McCord and Gunderson (2013) that payment for subcontractors from main contractor is very important because timeliness of payments affects many subcontractors, for whom receiving delayed payments from their general contractors, is a cause of friction between the two parties.

On the other hand, it is shown that, the responding contractors ranked "Practical and technical ability of the main contractors" as the second most important factors in the field that related to main contractors that affecting on the subcontractors' management with a mean value of 3.99. Otherwise it was ranked in the seventh position by the responding subcontractors with a mean value of 4.25. This result coincides with the result of Bakert et al (1988) that the technical performance is integrally associated with perceived success of a project.

While "Make sure that the subcontractors' price fit to quality and specifications" was ranked by the responding subcontractors as the second most important factor in the group that related to main contractors affecting on the subcontractors management in

the construction project in the Gaza Strip with a mean value of 4.53. These results are in agreement with Tam et al. (2011) that it is proposed that both price and technical performance should be considered in awarding subcontracts because the lowest bid practice in the local construction industry affects subcontractors' selection who submits the lowest price which it is the main reason contributing to the "cut corner" practice in the local construction industry.

Shortly as shown in 4.16: that, the two respondent contractors and subcontractors agreed with other with the most fifth important factors in the group related to main contractors affecting on the subcontractors' management in construction industry in the Gaza Strip.

Table 4.16: Rank and mean of factors for "Factors related to main contractor" for both contractors and subcontractors responses

	Item	Contractors Respondent		Subcontractors Respondent	
		Mean	Rank	Mean	Rank
1	Financial ability & strength of the main contractors	4.01	1	4.59	1
2	Practical and technical ability of the main contractors	3.99	2	4.25	7
3	Contractors performance of relevant previous projects	3.94	3	4.13	8
4	Previous experience, history and reputation of the main contractors	3.94	4	4.44	3
5	Make sure that the subcontractors' price fit to quality and specifications	3.84	5	4.53	2

4.1.2.6 Factors related to subcontractors

Table 4.17 shows the results of the main contractors' responses: The mean of factor "Practical and technical ability of the subcontractors" equals 3.94 (78.73%), Test-value = 7.64 and P-value = 0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this factor is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to this factor.

The lowest important factor is "Close control over the cost by the subcontractors" which has a mean equals 3.59 (71.75%), Test-value = 5.45, and P-value = 0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this factor is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to this factor.

The mean of the group "Factors related to subcontractors" equals 3.75 (75.06%), Test-value = 9.29, and P-value=0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this group is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to group of "Factors related to subcontractors ".

Table 4.17: Means and test values for "Factors related to subcontractors" for contractors responses

Item	Mean	Proportional mean (%)	Test value	P-value (Sig.)	Rank
Practical and technical ability of the subcontractors	3.94	78.73	7.64	0.000*	1
The extent of the subcontractor's commitment to the specifications and	3.88	77.50	9.40	0.000*	2
Prompt payment to labourers	3.81	76.20	6.62	0.000*	3
Previous experience, history and reputation of the subcontractors	3.81	76.15	6.67	0.000*	4
Providing adequate information /conditions to main contractor	3.79	75.75	7.41	0.000*	5
Financial ability & strength of the subcontractors	3.74	74.87	6.41	0.000*	6
The extent of the subcontractor's commitment to the project's schedule	3.71	74.25	6.85	0.000*	7
Performance of relevant previous projects	3.71	74.18	6.83	0.000*	8
Subcontractor familiarity with the nature of the required tests for its own	3.70	73.92	6.41	0.000*	9
Size of subcontractors' staff	3.62	72.47	5.14	0.000*	10
Close control over the cost by the subcontractors	3.59	71.75	5.45	0.000*	11
All items of the field	3.75	75.06	9.29	0.000*	

* The mean is significantly different from 3

Table 4.18 shows the results of the subcontractors' responses: The mean of factor "Practical and technical ability of the subcontractors" equals 4.34 (86.88%), Test-value = 13.94 and P-value = 0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this factor is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to this factor.

The mean of factor "Close control over the cost by the subcontractors" equals 3.78 (75.63%), Test-value = 4.69, and P-value = 0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this factor is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to this factor.

The mean of the group "Factors related to subcontractors" equals 4.11 (82.19%), Test-value = 14.06, and P-value=0.000 which is smaller than the level of significance

$\alpha = 0.05$. The sign of the test is positive, so the mean of this group is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to group of "Factors related to subcontractors ".

Table 4.18: Means and test values for "Factors related to subcontractors" for subcontractors

Item	Mean	Proportional mean (%)	Test value	P-value (Sig.)	Rank
Practical and technical ability of the subcontractors	4.34	86.88	13.94	0.000*	1
Previous experience, history and reputation of the subcontractors	4.31	86.25	10.72	0.000*	2
The extent of the subcontractor's commitment to the specifications and	4.29	85.81	11.18	0.000*	3
Prompt payment to laborers	4.22	84.38	9.76	0.000*	4
The extent of the subcontractor's commitment to the project's schedule	4.16	83.13	9.66	0.000*	5
Subcontractor familiarity with the nature of the required tests for its own	4.13	82.50	8.02	0.000*	6
Financial ability & strength of the subcontractors	4.06	81.25	6.34	0.000*	7
Performance of relevant previous projects	4.06	81.25	6.58	0.000*	7
Providing adequate information/conditions to main	3.94	78.75	4.93	0.000*	9
Size of subcontractors' staff	3.94	78.75	4.80	0.000*	9
Close control over the cost by the subcontractors	3.78	75.63	4.69	0.000*	11
All items of the field	4.11	82.19	14.06	0.000*	

* The mean is significantly different from 3

From Table 4.17 and 4.18, it is indicated that, "Practical and technical ability of the subcontractors" was ranked in the first position by both the contractors and subcontractors respondent with a mean value of (3.94) and (4.34) respectively. This emphasizes that, this is the most important factor in this field that related to subcontractors that affecting on the subcontractors' management in the construction projects in the Gaza Strip, this because that the quality of any work in the project depend on the subcontractor's performance so in any project subcontractors should have a good practical and technical ability to give the manager facilitation for good management of subcontractors in the project.

On the other hand, it is shown that, the responding contractors ranked "The extent of the subcontractor's commitment to the specifications and quality of the project" as the second most important factors that affecting on the subcontractors' management with a mean value of 3.88. Otherwise it was ranked in the third position by the responding subcontractors with a mean value of 4.29. The importance of this factor is because the commitment of the subcontractors to the specification and quality system of the project make it easier for the manager to control and manage them correctly and in the opposite side the lack of commitment of the subcontractors to the specification produce problems between the manager and them so it will affect negatively on the management of the subcontractors in the construction project.

"Previous experience, history and reputation of the subcontractors" was ranked by the responding subcontractors as the second most important factor in the field that related to subcontractors affecting on the subcontractors management in the construction project in the Gaza Strip with a mean value of 4.31. This result is complied with Enshassi et al. (2010) and Enshassi and Shoman (2008) that general contractors have indicated that they select the subcontractors according to the nature and specialty of the work and previous experience with subcontractors.

And, it is shown in the table 4.19 that the two responding contractors and subcontractors agreed with other that the "Close control over the cost by the subcontractors" was ranked in the last position of the importance factors affecting on the subcontractors' management in the construction project in the Gaza Strip with a mean value of (3.59) and (3.78) respectively.

Shortly as shown in 4.19 that the two respondents (contractors and subcontractors) are agree with other with the most fifth important factors in the group related to subcontractors affecting on the subcontractors' management in construction industry.

Table 4.19: Rank and mean of factors for "Factors related to subcontractor" for both contractors and subcontractors responses

	Item	Contractors Respondent		Subcontractors Respondent	
		Mean	Rank	Mean	Rank
1	Practical and technical ability of the subcontractors	3.94	1	4.34	1
2	The extent of the subcontractor's commitment to the specifications and quality of the project	3.88	2	4.29	3
3	Prompt payment to laborers	3.81	3	4.22	4
4	Previous experience, history and reputation of the subcontractors	3.81	4	4.31	2
5	Providing adequate information /conditions to main contractor	3.79	5	3.94	9
6	Close control over the cost by the subcontractors	3.59	11	3.78	11

4.1.2.7 Comparison between all groups of success factors affecting on subcontractors' management

Table 4.20 shows the opinions of the respondents about the groups of success factors affecting on subcontractors management in construction project in the Gaza Strip according to relative index from high to low.

Table 4.20: Rank and mean of groups of factors affecting on the subcontractors' management

Group	Contractors		Subcontractors	
	Mean	Rank	Mean	Rank
Factors pertaining to project manager	3.84	1	4.2	1
Factors related to main contractors	3.76	2	4.17	2
Factors related to subcontractors	3.75	3	4.11	3
Factors pertaining to project staff in general	3.64	4	4.07	4
Factors related to contract documents & management	3.64	4	3.99	5
Factors related to project's issues	3.6	6	3.49	6
Subcontractors management success factors	3.71		4.02	

From Table 4.20, it is shown that, "Factors pertaining to project manager" was ranked in the first position by both the contractors and subcontractors with a mean value of (3.84) and (4.20), respectively. This emphasizes that, this is the most important group of factors that affecting on subcontractors management in construction project in the Gaza Strip. Project manager plays a vital role in enhancing the management of the subcontractors' works in the project to finish the project with best way because leadership skills for project manager affect the degree of project performance.

On the other hand, it is shown that, the contractors and subcontractors respondent rank the group of "Factors related to main contractors" in the second position of the factors group affecting on the subcontractors' management in the construction project in the Gaza Strip with a mean value of (3.76) and (4.17) respectively. This means that the main contractors play a vital role in success of the subcontractors' management in the construction project, so it should choose the suitable main contractor with high experience.

And, as shown in table 4.20 that the contractors and subcontractors responses supports each other about that the group of "Factors related to subcontractors" ranked in the third position of the factors group affecting on the subcontractors' management in the construction project in the Gaza Strip with a mean value of (3.75) and (4.11) respectively.

Shortly, it can be said that the two responses contractors and subcontractors is agree with other about the ranking of the groups of the success factors affecting on the subcontractors' management in the construction project.

Finally, it is shown that, "Factors related to project's issues" was ranked in the last position by both the contractors and subcontractors responses with a mean value of (3.6) and (3.49) respectively.

4.1.2.8 Ranking and means of all success factors affecting on the subcontractors management

Table 4.21 shows the rank and mean of all success factors affecting on the subcontractors' management in the construction project from point view of both contractors and subcontractors.

Table 4.21: Ranking and mean of all factors affecting on the subcontractors' management

	Factors	Contractors		Subcontractors	
		Mean	Rank	Mean	Rank
1.1	The presence of the project in a densely populated place	3.19	60	3.16	61
1.2	Project life cycle schedule is a deliberate and difficult implementation	3.81	21	3.69	54
1.3	Large/complex project	3.68	41	3.42	58
1.4	Increase the additional work for the project from the limit set in the contract	3.43	57	3.19	60
1.5	Remote location (difficult accessibility to the site)	3.22	59	2.78	63
1.6	There is no contingency budget to proceed works	3.61	49	3.69	54
1.7	Increasing the fundamental changes in the nature of works	3.72	35	3.81	47
1.8	Many execution obstacles	3.76	28	3.70	53
1.9	Government policy, market condition & political situation	3.99	4	3.94	42
2.1	Implementing the lowest bid price system	3.67	42	4.10	29
2.2	Selection of subcontractors through competitive strategy & taking the lowest price as the only criteria for selection	3.73	33	3.90	43
2.3	Assisting the main contractors in pricing the tender by the subcontractors	3.56	53	3.80	48
2.4	The subcontractors is preferred to be company registered in the contractors union	3.06	62	3.29	59
2.5	Clear understanding of the contract conditions and requirements, project objectives and implementation methods by the contractors and subcontractors	3.85	18	4.32	16
2.6	The clarity of the contract between contractors and subcontractors	3.94	9	4.58	5
2.7	Delays in the adoption of change orders	3.61	50	3.81	45
2.8	Compliance with regulations by the contractors & subcontractors	3.65	43	3.75	50

Table 4:19. Continued...

	Factor	Contractors		Subcontractors	
		Mean	Rank	Mean	Rank
2.9	Adherence to subcontract requirements	3.60	51	4.39	10
2.10	Quality and clarity of design drawing and shop drawings	4.03	2	4.34	12
2.11	Payment method to the main contractor by the client	3.96	6	4.44	8
2.12	Insurance terms, interest rate and bond/loan terms	3.13	61	3.16	61
2.13	The extent of application of quality system in the project	3.44	56	4.00	37
3.1	The lack of the efficiency, qualification and skills of the project team	3.96	8	4.09	30
3.2	Morally support the project staff	3.40	58	3.72	52
3.3	Preparation of training courses qualify the project staff to work on-site	3.05	63	3.44	57
3.4	Number of craftsmen and laborers in the project	3.62	47	3.88	44
3.5	Qualified supervisory staff	3.93	13	4.69	1
3.6	Collaboration between the staff of the project	3.91	14	4.59	2
4.1	Manager personality & his experience	4.11	1	4.59	2
4.2	Salary of the managers	3.73	33	4.09	30
4.3	Management level leadership	3.87	16	4.13	25
4.4	Regular and effective communication & coordination with main contractor and subcontractors by the project manager	3.75	29	4.34	12
4.5	Managers should realize the other construction activities related to subcontractors tasks to ensure the continuity of the work of subcontractors	3.79	24	4.47	7
4.6	Coordination between all subcontractors working in the same project	3.65	43	4.00	37
4.7	Ability to undertake the size of work by the project manager	3.96	6	4.31	17
4.8	Monitor subcontractors' work process to ensure they are doing things according to plan and method statements	3.86	17	4.16	23
4.9	Project manager should obtain written approval from consultant for any work before start	3.78	26	3.75	50
5.1	Previous experience, history and reputation of the main contractors	3.94	11	4.44	8
5.2	Practical and technical abil8lity of the main contractors	3.99	4	4.25	21
5.3	Contractors performance of relevant previous projects	3.94	9	4.13	25
5.4	Financial ability & strength of the main contractors	4.01	3	4.59	2
5.5	Ability in dealing with uncertainty in the construction projects	3.54	54	3.63	56
5.6	Controlling and follow up of subcontractors activities by main contractor's engineers	3.73	32	4.03	35

Table 4:19. Continued…

	Factor	Contractors		Subcontractors	
		Mean	Rank	Mean	Rank
5.7	Financial facilitation to subcontractors to be able to purchase the materials and equipment	3.51	55	4.34	12
5.8	Main contractor should give a subcontractors management work plan before start the work	3.62	47	4.29	19
5.9	Providing subcontractors location services and work requirements	3.77	27	4.38	11
5.10	Make sure that the subcontractors' price fit to quality and specifications	3.84	19	4.53	6
5.11	Commitment of the main contractors with project schedule	3.71	37	4.13	25
5.12	Ability in bearing the risk in case payment delay from the client	3.71	39	3.94	39
5.13	Bearing responsibility in case of accidents	3.75	29	3.81	45
5.14	Relationship with subcontractor/client/consultant	3.82	20	4.06	32
5.15	Lack of trust between main contractors and subcontractors	3.65	45	4.03	35
6.1	Size of subcontractors' staff	3.62	46	3.94	39
6.2	Previous experience, history and reputation of the subcontractors	3.81	23	4.31	17
6.3	Practical and technical ability of the subcontractors	3.94	11	4.34	12
6.4	Financial ability & strength of the subcontractors	3.74	31	4.06	32
6.5	Performance of relevant previous projects	3.71	37	4.06	32
6.6	Subcontractor familiarity with the nature of the required tests for its own work and materials supplied by him.	3.70	40	4.13	25
6.7	The extent of the subcontractor's commitment to the specifications and quality of the project	3.88	15	4.29	19
6.8	The extent of the subcontractor's commitment to the project's schedule	3.71	36	4.16	23
6.9	Close control over the cost by the subcontractors	3.59	52	3.78	49
6.10	Prompt payment to laborers	3.81	22	4.22	22
6.11	Providing adequate information/conditions to main contractor	3.79	24	3.94	39

4.1.2.9 Top ten success factors affecting on the subcontractors' management for contractors responses

Table 4.22 shows the top ten factors affecting on the subcontractors' management in the construction project from point view of contractors.

Table 4.22: Top ten success factors affecting on the subcontractors management for contractors responses

	Factors	Contractors	
		Mean	Rank
1	Manager personality & his/her experience	4.11	1
2	Quality and clarity of design drawing and shop drawings	4.03	2
3	Financial ability & strength of the main contractors	4.01	3
4	Practical and technical ability of the main contractors	3.99	4
5	Government policy, market condition & political situation	3.99	4
6	Ability to undertake the size of work by the project manager	3.96	6
7	Payment method to the main contractor by the client	3.96	6
8	The lack of the efficiency, qualification and skills of the project team	3.96	8
9	Contractors performance of relevant previous projects	3.94	9
10	The clarity of the contract between contractors and subcontractors	3.94	9

4.1.2.10 Top ten success factors affecting on the subcontractors' management for subcontractors responses

Table 4.23 shows the top ten factors affecting on the subcontractors' management in the construction project from point view of subcontractors.

Table 4.23: Top ten success factors affecting on the subcontractors management for subcontractors responses

	Factors	Subcontractors	
		Mean	Rank
1	Qualified supervisory staff	4.69	1
2	Collaboration between the staff of the project	4.59	2
3	Manager personality & his/her experience	4.59	2
4	Financial ability & strength of the main contractors	4.59	2
5	The clarity of the contract between contractors and subcontractors	4.58	5
6	Make sure that the subcontractors' price fit to quality and specifications	4.53	6
7	Managers should realize the other construction activities related to subcontractors tasks to ensure the continuity of the work of subcontractors	4.47	7
8	Previous experience, history and reputation of the main contractors	4.44	8
9	Payment method to the main contractor by the client	4.44	8
10	Adherence to subcontract requirements	4.39	10

From table 4.22 and table 4.23, it is shown that "Manager Personality & his/her experience" was ranked in the first position by contractors' respondent with a mean value of (4.11), and ranked by subcontractors' responses in the second position with a mean value of (4.69). This result indicates that the manager personality and experience is the most critical factor that affecting the subcontractors' management in the construction project in the Gaza Strip, So that the project manager in the construction project should have high experience and his character must be strong and leadership to be able to manage subcontractors in the project correctly. And on the other hand subcontractors' responses rank "Qualified supervisory staff" in the first position of the importance factors affecting on the subcontractors' management since if the supervisory staff is weak technically; we will not get the good performance from the subcontractors in the project.

Also it is clear from table 4.22, that "Quality and clarity of design drawing and shop drawings" was ranked in the second position by contractors' responses with a mean value of (4.03). This emphasize that, this is the an important factor affecting on the subcontractors' management, since the quality and clarity of the drawing will reduce the problems in the performance of the subcontractors in the project, thus this make it easier for the project manager to manage the subcontractors in the project successfully.

From table 4.22 and table 4.23, it is shown that "Financial ability & strength of the main contractors" was ranked in the third position of the important factors with a mean value of (4.01), and ranked by subcontractors' responses in the second position with a mean value of (4.69). This emphasize that, this is an important factor affecting on the subcontractors' management since the financial problems of the main contractor will impose financial difficulties on the subcontractor and make him unable to pay for the workers and suppliers, which leads to delay in the completing the works on time and with the required quality. The obtained results complied with many papers emphasized that good contractor's financial lead to avoid problems between contractors and subcontractors, subsequently enhance the managing of the subcontractors in the construction project.

On the other hand, as shown in table 4.22 that "Practical and technical ability of the main contractors" and "Government policy, market condition & political situation" were ranked in the fourth position of the important factors with a mean value of (3.99). this emphasize that, this are an important factors affecting on the subcontractors' management, because that the weak practical and technical ability of the main contractors lead to delay and low quality of works and make the project manager un able to manage the subcontractors correctly and successfully in the project, and in the other hand, the deteriorating political and economic situation in is one of the obstacles that hinder the works of the project manager in managing the subcontractors in the project.

Finally, from the point of view of two respondent contractors and subcontractors, the top seven critical factors affecting the subcontractors management in the construction industry in the Gaza Strip are (Manager personality & his/her experience, financial ability & strength of the main contractors, government policy, market condition & political situation, quality and clarity of design drawing and shop drawings, practical

and technical ability of the main contractors, qualified supervisory staff and the clarity of the contract between contractors and subcontractors) so we should pay more attention in these factors to enhance the managing of the subcontractors in the construction project in the Gaza Strip.

4.1.3 Section three: The effect of subcontractors' management in saving the project cost and time.

Table 4.24 shows the results of the main contractors' responses: The mean of factor "Overhead percentage of project" equals 3.94 (76.62%), Test-value = 6.82, and P-value = 0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this factor is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to this factor.

The lowest important factor is "Time needed to implement variation orders" which has a mean equals 3.50 (70.00%), Test-value = 4.05, and P-value = 0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this factor is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to this factor.

The mean of the group "The effect of subcontractors management in saving the project cost and time" equals 3.69 (73.73%), Test-value = 8.21, and P-value=0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this field is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to group of "The effect of subcontractors' management in saving the project cost and time ".

Table 4.24: Means and test values for "The effect of subcontractors' management in saving the project cost and time" for contractors

Item	Mean	Proportional mean (%)	Test value	P-value (Sig.)	Rank
Overhead percentage of project	3.83	76.62	6.82	0.000*	1
Planned time for project construction	3.79	75.84	6.75	0.000*	2
Cost of variation orders	3.75	75.06	7.30	0.000*	3
Project labor cost	3.71	74.21	7.07	0.000*	4
Material and equipment cost	3.69	73.77	5.66	0.000*	5
Waste rate of materials	3.67	73.42	5.00	0.000*	6
Profit rate of project	3.66	73.16	5.45	0.000*	7
Time needed to rectify defects	3.56	71.17	4.81	0.000*	8
Time needed to implement variation orders	3.50	70.00	4.05	0.000*	9
All items of the field	3.69	73.73	8.21	0.000*	

* The mean is significantly different from 3

Table 4.25 shows the results of the subcontractors' responses: The mean of factor "Planned time for project construction" equals 4.16 (83.13%), Test-value = 8.10, and P-value = 0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this item is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to this factor.

The lowest important factor is "Project labor cost" which has a mean equals 3.47 (69.38%), Test-value = 2.46, and P-value = 0.010 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this factor is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to this factor.

The mean of the group "The effect of subcontractors management in saving the project cost and time" equals 3.79 (75.83%), Test-value = 5.75, and P-value=0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this group is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to this group.

Table 4.25: Means and test values for "The effect of subcontractors' management in saving the project cost and time" for subcontractors

Item	Mean	Proportional mean (%)	Test value	P-value (Sig.)	Rank
Planned time for project construction	4.16	83.13	8.10	0.000*	1
Waste rate of materials	4.00	80.00	5.57	0.000*	2
Overhead percentage of project	3.91	78.13	4.84	0.000*	3
Time needed to implement variation orders	3.78	75.63	4.53	0.000*	4
Time needed to rectify defects	3.75	75.00	3.94	0.000*	5
Material and equipment cost	3.72	74.38	3.56	0.001*	6
Cost of variation orders	3.69	73.75	3.47	0.001*	7
Profit rate of project	3.66	73.13	3.01	0.003*	8
Project labor cost	3.47	69.38	2.46	0.010*	9
All items of the field	3.79	75.83	5.75	0.000*	

* The mean is significantly different from 3

From Table 4.24, it is shown that, "Overhead percentage of project" was ranked in the first position by the contractors' respondent with a mean value of (3.83). This emphasizes that, this is the most important factor of the factors related to the effect of subcontractors' management in saving the project cost and time. So it should minimize the overhead of the project by enhancing the management of the project to contribute of saving the project cost.

On the other hand, from table 4.25 it is shown that, "Planned time for project construction" was ranked by the subcontractors respondent in the first important factor that related to the effect of subcontractors management in saving the project cost and time with a mean value of (4.16) but this same factor was ranked by the contractor responses in the second position of the importance with a mean value of (3.79). This means that minimizing the implementation time of the work contribute in the cost saving of the project so it should manage subcontractors correctly that lead to minimize the overall time of the project.

On the other hand, it is shown that, "Waste rate of materials" was ranked by the subcontractors responses in the second position of the importance factors that related to the effect of the subcontractors management in saving the project cost and time with a mean value of (4.00). And, as shown in table 4.24 and 4.25 that contractors response rank "Cost of variation orders" in the third position of the importance of the factors related to the effect of the subcontractors management in saving the project cost and time with a mean value of (3.75). Otherwise, the subcontractors' responses rank "Overhead percentage of project" in the third position with a mean value of (3.91).

Finally, it is shown that, "Time needed to implement variation orders" was ranked in the last position by the contractors' responses of the importance of the factors related to the effect of the subcontractors' management in saving the project cost and time with a mean value of (3.50). But subcontractors' responses rank "Project labor cost" in the last position with a mean value of (3.47).

This mean that a good subcontractors' management in construction project effect on minimizing the overhead percentage of the project, planned time for project construction, project labor cost and cost of variation orders.

4.1.4 Section four: The barriers for the good performance of subcontractor's team

Table 4.24 shows the results of the main contractors' responses: The mean of factor 4 "Low price of the subcontractor's contract and low percentage of the profit" equals 3.84 (76.84%), Test-value = 7.49, and P-value = 0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this factor is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to this factor.

The lowest important factor is "Unsuitable working environment" which has a mean equals 3.20 (63.95%), Test-value = 1.41, and P-value = 0.082 which is greater than the level of significance $\alpha = 0.05$. Then the mean of this factor is insignificantly different from the hypothesized value 3. It is concluded that the respondents (Do not know, neutral) to this factor.

The mean of the group "The barriers for the good performance of subcontractor's team" equals 3.58 (71.52%), Test-value = 7.48, and P-value=0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this group

is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to this group.

Table 4.26: Means and test values for "The barriers for the good performance of subcontractor's team" for contractors

Item	Mean	Proportional mean (%)	Test value	P-value (Sig.)	Rank
Low price of the subcontractor's contract and low percentage of the profit	3.84	76.84	7.49	0.000*	1
The duration that allocated for the subcontractor's activities commensurate with the size of work	3.84	76.72	7.92	0.000*	2
Low number of experienced site supervisory staff	3.79	75.73	6.23	0.000*	3
Bad communication between contractors and subcontractors	3.78	75.58	6.24	0.000*	4
Non ability to control duration	3.74	74.81	6.64	0.000*	5
Lack of subcontractor equipment to finish his work	3.73	74.55	6.68	0.000*	6
Low salary for workers of subcontractor's team	3.61	72.27	6.23	0.000*	7
Bad collaboration between project staff	3.58	71.69	4.50	0.000*	8
No facilitate the arrivals of subcontractor's team to the project site	3.53	70.67	4.22	0.000*	9
Lack of good construction technique	3.51	70.13	4.80	0.000*	10
Weak compliance with general and contractual obligation	3.48	69.61	3.58	0.000*	11
unfamiliarity of work and location	3.39	67.89	3.61	0.000*	12
Unsafe working environment	3.34	66.75	2.65	0.005*	13
No safety approach used by site manager	3.27	65.45	2.07	0.021*	14
Unsuitable working environment	3.20	63.95	1.41	0.082	15
All items of the field	3.58	71.52	7.48	0.000*	

* The mean is significantly different from 3

Table 4.27 shows the results of the subcontractors' responses: The mean of factor "Lack of subcontractor equipment to finish his work" equals 4.28 (85.63%), Test-value = 9.39, and P-value = 0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this item is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to this factor.

The lowest important factor is "Lack of good construction technique" which has a mean equals 3.38 (67.50%), Test-value = 2.44, and P-value = 0.010 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this factor is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to this factor.

The mean of the group "The barriers for the good performance of subcontractor's team" equals 3.79 (75.85%), Test-value = 7.62, and P-value=0.000 which is smaller than the level of significance $\alpha = 0.05$. The sign of the test is positive, so the mean of this group is significantly greater than the hypothesized value 3. It is concluded that the respondents agree to this group.

Table 4.27: Means and Test values for "The barriers for the good performance of subcontractor's team" for subcontractors' responses

Item	Mean	Proportional mean (%)	Test value	P-value (Sig.)	Rank
Lack of subcontractor equipment to finish his work	4.28	85.63	9.39	0.000*	1
Low number of experienced site supervisory staff	4.13	82.58	5.95	0.000*	2
Low price of the subcontractor's contract and low percentage of the profit	4.03	80.63	5.49	0.000*	3
Bad collaboration between project staff	4.00	80.00	7.04	0.000*	4
Low salary for workers of subcontractor's team	3.97	79.38	5.31	0.000*	5
Bad communication between contractors and subcontractors	3.94	78.75	5.07	0.000*	6
The duration that allocated for the subcontractor's activities commensurate with the size of work	3.87	77.33	5.52	0.000*	7
Non ability to control duration	3.84	76.88	5.00	0.000*	8
Weak compliance with general and contractual obligation	3.75	75.00	3.83	0.000*	9
Unsuitable working environment	3.66	73.13	3.82	0.000*	10
Unsafe working environment	3.63	72.50	3.30	0.001*	11
No facilitate the arrivals of subcontractor's team to the project site	3.59	71.88	2.18	0.019*	12
No safety approach used by site manager	3.41	68.13	1.66	0.054	13
unfamiliarity of work and location	3.40	68.00	2.35	0.013*	14
Lack of good construction technique	3.38	67.50	2.44	0.010*	15
All items of the field	3.79	75.85	7.62	0.000*	

* The mean is significantly different from 3

From table 4.26 and table 4.27, it is shown that "Low price of the subcontractor's contract and low percentage of the profit" was ranked by the contractors responses in the first position of the importance of the factors affecting to lack of access to good performance with a mean value of (3.84), this is because when the price of the subcontract was low, it will affect the subcontractors' performance then will affect the project quality of the work because they will work reluctantly. But in the other hand the subcontractors' respondent ranked the "Lack of subcontractor equipment to finish his work" is the first important factors with a mean value of (4.28).

On the other hand, it is shown that, "The duration that allocated for the subcontractor's activities commensurate with the size of work" was ranked by the contractors' responses in the second position of the importance of the factors affecting to lack of access to good performance with a mean value of (3.84), this because when the duration of any work was little compared with the big size of the work, the subcontractors' workers will do the work quickly at the expense of work quality. But in the other hand in the subcontractors respondent opinion that the "Low number of experienced site supervisory staff" is the second important factors affecting to lack of access to good performance with a mean value of (4.13).

On the other hand, contractors' responses rank "Low number of experienced site supervisory staff" in the third position of the importance factors affecting to the lack of access to good performance with a mean value of (3.79). this result is in line with the result of Enshassi et al (2009) that consultants are urged to facilitate and expedite orders delivered to contractors to obtain better time performance and to minimize disputes and claims. But subcontractor responses rank "Low price of the subcontractor's contract and low percentage of the profit" in the third position with a mean value of (4.03), the low price of the subcontract will effect on the performance of the subcontractors' workers in the project and in the project quality and will constitute a key obstacle in the face of the project manager in dealing with subcontractors in the site therefore will effect negatively the subcontractors' management in the construction industry.

On the other hand, the contractors' responses rank "Bad communication between contractors and subcontractors" in the fourth position of the importance factors affecting on the lack of access to good performance with a mean value of (3.78). But subcontractors' responses rank "Bad collaboration between project staff" in the fourth position with a mean value (4.00). Shortly, the results show that there are some agree in the opinion of the two responses in the first six important factors which lead to get the bad performance of the subcontractor's team.

Finally, it is shown that, "Unsuitable working environment" was ranked in the last position by the contractors with a mean value of (3.20), and the subcontractors' responses rank "Lack of good construction technique" in the last position with a rank (3.97), this emphasizes that; the unsuitable working environment did not affect the subcontractors' performance in the project. This result contrary to the result of Enshassi et al (2009) that due to the difficult political situation from which suffers, local construction projects suffer from a number of problems because of closures and materials shortage. These problems can be considered as an obstacle for time performance of projects.

4.2 Interview Result

This section display a result of the responses of the ten experts which interviewed such as project managers, main contractors and subcontractor to identified the most critical factors affecting the subcontractors' management in the construction industry in the Gaza Strip. This section consisted of three sub sections as mentioned before in methodology chapter that help us in identifying the required objectives of the research.

4.2.1 Section One: What are the most CSFs affecting on the subcontractors' management in the construction projects in the Gaza Strip?

A. Factors related to project's issues or General conditions surrounding the project

From the responses it is shown that there is consensus that "poor political and Social, economic conditions in Gaza" is the most critical factors affecting in the subcontractors' management in the construction industry in the Gaza Strip. This result is in line with the result of the questionnaire that the hard political and economic situation of the Gaza strip during the continued closer of the crossings and Israeli attacks with different shapes: lead to the difficulty of managing subcontractors in the project because of most of the subcontractors is unemployed and in bad social status.

On the other hand six from the experts that interviewed agreed that implementing the lowest bid price system by the owner in the construction projects is the second most important factors affecting subcontractors' management in the project because it lead the main contractors to choose the lowest price of the subcontractors without considering the experience of the subcontractor and without interest the quality and the performance of the project, this result is not in agreement with the result of the questionnaire as this factor is not in the second position of the importance factors affecting the subcontractors' management, it ranked in the sixth position of the importance in the questionnaire.

In another hand the other experts which interviewed supposed that the nature and type of the project is the second important factor affecting the subcontractors' management in the construction project in the Gaza strip this mean that the difficulty and complexity of the project play a vital role in the management of the subcontractors in the project.

On the other hand seven from the ten experts ranked "The lack of the staff supervision experience" in the third position of the important factors affecting the subcontractors' management in the project because when the supervisor was not experience the subcontractor will work without interest in the quality of the work, this will affect negatively the subcontractors' management in the construction project. This result is in complement with the result of the questionnaire in the group of "Factors pertaining to project staff in general" that the experience of the supervisory staff influence over the contractors and subcontractor's commitment to the drawings and specifications that lead to got the required quality and a good performance and make it easier for the main contractor in management of the subcontractors in the site.
In the other hand "Material existence in the project continuously by the owner" was ranked by the other three experts in the third position of the importance because the

delay in the material existence in the project will cause problems between the project parties and affects negatively the subcontractors' management.
On the other hand the other critical factors related to project's issues or general condition surrounding the project affecting on the subcontractors' management in the construction industry from the perspective of experts that interviewed are:

1. Currency stability
2. Providing security and safety system in the project site
3. Intensity of competition among general contractors in addition to increasing the number of construction companies

B. <u>Factors related to contract documents & management</u>

From the responses it is shown that there is consensus of eight experts from the ten that "Clarity of tender documents, drawings and bills of quantities" is the most critical factors related to contract documents & management affecting in the subcontractors' management in the construction industry in the Gaza Strip, this because the clarity of tender documents, drawing and bills of quantities facilitate, minimize, solve and controlling any disputes occur in the project between project's parties specially between main contractors and their subcontractors therefore this events improve the management of the subcontractors in the construction projects. This result is close to the result of the questionnaire by contractor respondents that "Quality and clarity of design drawing and shop drawing" is the most critical factors for subcontractors' management.

On the other hand, "Tender price between the general contractor and client and between general contractor and subcontractor" was ranked by most of the experts which interviewed in the second position of the importance factors affecting subcontractors' management, because if the price of the tender between the main contractor and the client was weak this will affect the subcontract price and therefore will affect the performance of the subcontractors in the project and also the quality of the works. All of that effect the subcontractors' management negatively in the subcontractors' management in the project.

The result of the questionnaire contravenes with this result, in the questionnaire the factor "implementing the lowest bid price" which similarity to tender price factor was ranked in the sixth position of importance factor affecting subcontractors' management.

On the other side, some of the interviewed experts stated that "clarity of the contract between contractor and subcontractor" lie in the third position of the important factors affecting the subcontractors' management, they explained that the subcontract should be clear and inclusive of all contractual issues to avoid any problem can occur and to enhance the management of the subcontractors in the project by the main contractor to get the best performance with best quality. This result coincide with the result of the questionnaire by the contractors respondents that this factor lie in the third position of the importance contrary to the subcontractors respondents that "adherence to subcontract requirements" is in third position of the importance factors affecting subcontractors' management. The other experts stated that the clarity of the contract between the client and main contractors is more important than clarity of the subcontract.

On the other hand the other critical factors related to contract documents & management affecting on the subcontractors' management in the construction industry from the perspective of experts that interviewed are:

1. Payment method for general contractor and for subcontractor.
2. Clear understanding of the contract conditions and requirements, project objectives and implementation methods by the contractors and subcontractors.
3. Comprehensiveness of tender documents for all works to achieve the project's objectives.
4. No commensuration between the duration that allocated for the subcontractor's activities and the size of work.

C. Factors pertaining to project manager

From the responses it is shown that there is consensus that "Manger personality & his experience" is the most critical factors related to project manager affecting in the subcontractors' management in the construction industry in the Gaza Strip, this result is in line with the result of the questionnaire that project manager should have a strong personality and high experience to be able to manage subcontractors in the project in the best way.

On the other hand, sixth from the experts stated that "Control all construction activities related to subcontractors tasks to ensure the continuity of the work of subcontractors" was the second important factor affecting the subcontractors' management, this result inconsistent with the questionnaire result which stated that the ability to undertake the size of work by project manager was ranked in the second position of the importance. The other experts stated that the factor "Relationship between project manager and all project staff specially subcontractor" was the second important factor affecting the subcontractors' management because when the relationship between the project manager and the subcontractors is good, it facilitate the management of the subcontractors by the manager because the subcontractors will be obedience to orders.

On the other hand the other critical factors related to project manager affecting on the subcontractors' management in the construction industry from the perspective of experts that interviewed are:

1. Full knowledge of tender documents
2. Monitor subcontractors' work process to ensure they are doing things according to plan and method statements.
3. Implementation of relevant previous projects.

D. Factors related to main contractors

It is shown that some of the experts interviewed stated that "Financial ability & strength of the main contractors" is the most critical factors related to main contractors affecting in the subcontractors' management in the construction industry in the Gaza Strip which is in line with the questionnaire' result that main contractor should have a good financial ability to be able to pay for subcontractors in the bad situation to be able managing subcontractors correctly. The other experts stated that "Previous experience,

history and reputation of the subcontractors" is important than financial ability in affecting the subcontractors' management in construction project.

On the other hand, it is shown that there is consensus that "Effective selection the efficient subcontractors and not to adopt the lowest prices as a selection criteria of subcontractors" is in the third position of the important factors affecting subcontractors' management.

On the other hand the other critical factors related to main contractors affecting on the subcontractors' management in the construction industry from the perspective of experts that interviewed are:

- Providing materials and equipment by the contractor to the subcontractors for finishing the work on time.
- Contractors' performance of relevant previous projects.

E. <u>Factors related to subcontractors</u>

From the expert's respondents it is shown that there is consensus that "Previous experience, history and reputation of the subcontractors" is the most critical factors related to subcontractors affecting in the subcontractors' management in the construction industry in the Gaza Strip. This result was not agreed with the result of the questionnaire which stated that "Previous experience, history and reputation of the subcontractors" was not in the first position; it was in the second position of the important factors affecting subcontractors' management.

On the other hand, some of the experts stated that" Financial ability & strength of the subcontractors" is the second important factors affecting the subcontractors' management in the project because they should have a financial ability to be able to finish the work and to be able not to wait the main contractors' payment for him. And the other experts show that the "Payment method for subcontractors" is more important that financial ability of the subcontractors in the affecting on the subcontractors' management in the construction project.

On the other hand the other critical factors related to subcontractors affecting on the subcontractors' management in the construction industry from the perspective of experts that interviewed are:

1. Subcontractors must be honest and no cheating in his/her works.
2. Size of subcontractors' staff
3. Subcontractors should have all materials, equipment and any others relation to the work
4. Regular and effective communication & coordination with main contractor and supervision team by the subcontractor
5. The extent of the subcontractor's commitment to the specifications and quality of the project

4.2.2 Section two: Impact of the subcontractors' management related to factors of cost and time of the project?

From the responses it is shown that some of the experts that interviewed stated that subcontractors' management in the construction project lead firstly to minimize the proposed time of period for finishing the project, this factors was ranked in the second position in the questionnaire. The other stated that the good management of the subcontractors led to minimize the project labor cost. This result didn't coincide with the result of the questionnaire which stated that the overhead percentage of project is the first factor of the project cost and time that subcontractors' management lead to.

On the other hand, some of the experts stated that the good management of the subcontractors led to minimize material and equipment cost in the project in the second position, while the other experts which interviewed put the factor of "minimizing the waste rate of materials" in the second position of the important factors that subcontractors' management lead to.

On the other hand, the other factors of project cost and time that good subcontractors' management lead to minimize it is shown below:

- Good planning for project's activities saving or minimizing the time consuming in work.
- The extent of application of quality system in the project by the subcontractors' staff to avoid reworking and variations.
- Increasing the profit rate of project

4.2.3 Section three: The barriers for the good performance of subcontractor's team in the construction project?

From the experts' respondent it is shown that there is consensus that "lack of experience of the subcontractors' team" is the most critical factors that prevent access to good performance of the subcontractors' team in the construction project in the Gaza Strip. This result did not coincide with the result of the questionnaire which explained that the most critical factors lead to get bad performance were "low price of the subcontract" from the contractors' views and "lack of subcontractor equipment" from the subcontractors' views.

On the other hand, some of the experts that interviewed stated that the non-commensurate between the duration that allocated for subcontractor's activities and the size of the work is in the second critical factors that prevent getting the good performance of subcontractor's team in the construction project, this result coincide with the result of the questionnaire of contractors respondents but didn't coincide with the result of the subcontractors' respondents. But the other experts ranked the factor of "low price of the subcontract and low percentage of the profit" in the second position of importance.

On the other hand, some of the experts witch interviewed stated that the lake of experience of supervisory staff was one of the major causes of lack of access to good performance of subcontractors' team which ranked in the third position, this result is in

agree with the result of questionnaire. But the other experts ranked the project manager experience in the third position of the important factors lead to get bad performance of subcontractors in the project.

On the other hand, some of the experts stated that average delay because of closures leading to materials shortage play an important role in affecting the performance of construction projects in general and specially subcontractors" performance. This result did not coincide with the result of the questionnaire which showed that the unsuitable working environment ranked in the last position of the factors that led to get bad subcontractors' performance.

On the other hand the other critical factors that prevent access to good performance of the subcontractors' team in the construction project in the Gaza Strip from the perspective of experts that interviewed are:

1. Lake of the project's materials and equipment
2. Dis-satisfaction of the subcontractors about the contract price.
3. Dis-satisfaction of the subcontractors' workers about the salary
4. Lake of equipment and material's quality that related to domestic market
5. Poor political and economic conditions affecting on the material's quality.
6. Lack of equipment and material in the project to finish the work
7. No controlling and follow up of subcontractors activities by main contractor's engineers

4.3 Research Hypotheses

Hypothesis #1:

There is a relationship between the subcontractor's performance and the CSFs of the subcontractors.

Table (4.28) show that the correlation coefficient between the subcontractor's performance and the CSFs of the subcontractors equals 0.51 and the p-value (Sig.) equals 0.000. The p-value (Sig.) is less than 0.05, so the correlation coefficient is statistically significant at $\alpha = 0.05$. It is concluded that there exists a significant relationship between the subcontractor's performance and the CSFs of the subcontractors.

Table 4.28: Correlation coefficient between the subcontractor's performance and the CSFs of the subcontractors

	Pearson Correlation Coefficient	P-Value (Sig.)
Factors related to project's issues	0.370	0.000*
Factors related to contract documents & management	0.450	0.000*
Factors pertaining to project staff in general	0.353	0.000*
Factors pertaining to project manager	0.471	0.000*
Factors related to main contractors	0.450	0.000*
Factors related to subcontractors	0.431	0.000*
Subcontractors management success factors	**0.510**	**0.000***

* Correlation is statistically significant at 0.05 level

Hypothesis #2:

There is a relationship between subcontractor's management and the saving of the project cost and time.

Table (4.29) show that the correlation coefficient between subcontractor's management and the saving of the project cost and time equals .638 and the p-value (Sig.) equals 0.000. The p-value (Sig.) is less than 0.05, so the correlation coefficient is statistically significant at $\alpha = 0.05$. It is concluded there exists a significant relationship between subcontractor's management and the saving of the project cost and time.

Table 4.29: Correlation coefficient between subcontractor's management and the saving of the project cost and time

	Pearson Correlation Coefficient	P-Value (Sig.)
There is relationship between subcontractor's management and the saving of the project cost and time.	0.638	0.000*

* Correlation is statistically significant at 0.05 level

4.4 Hypotheses testing

In order to check the internal consistency of results among causes groups and within groups, it is necessary to compare according to an independent variable by using the One-Way ANOVA test.

The One-Way ANOVA test is a one-way analysis of variance for a quantitative dependent variable by a single factor (independent variable). This test is used in order to check out if there are any significant differences in the points of view of the respondents toward CSFs for subcontractors management in construction projects in the Gaza strip due to " Type of contractor, classification category of the company, years of experience of the company, location of the company, position of the person filling the questionnaire, years of experience of the person filling the questionnaire, number of fixed-term management employees in the company, number of fixed-term workers and technicians in the company, specialty of Subcontractor, location of the subcontractor's company, years of experience of the subcontractor and staff of the Subcontractor".

Hypothesis 1: Type of contractor (general contractor – subcontractor)

The null hypothesis stated that there is no significant difference in the point of view of respondents regarding CSFs for subcontractors' management in construction projects in the Gaza strip could be ascribed to the type of contractor (main or subcontractor).

In order to test this hypothesis One Way ANOVA statistical test is used to provide the research with valuable results. The results illustrated in Table 4.30 show that the p-value (Sig.) is greater than the level of significance $\alpha = 0.05$ for the factors related to these groups "Factors related to project's issues. The effect of subcontractors management in saving the project cost and time and the barriers for the good performance of subcontractor's team", so this mean that there is no significant difference among the respondents toward these groups due to type of contractor. It is concluded that the type of contractor has no effect on the result of this group of factors affecting subcontractors' management.

For the other fields, the p-value (Sig.) is smaller than the level of significance $\alpha = 0.05$, then there is significant difference among the respondents toward these fields due to type of contractor. It is concluded that the type of contractor has an effect on the results of the other groups.

Table 4.30: Independent samples T-test test of the fields and their p-values for type of contractor

Field	Means		Test Value	Sig.
	Main Contractor	Subcontractor		
Factors related to project's issues	3.60	3.49	0.741	0.460
Factors related to contract documents & management	3.64	3.99	-2.807	0.006*
Factors pertaining to project staff in general	3.64	4.07	-2.799	0.006*
Factors pertaining to project manager	3.84	4.20	-2.574	0.011*
Factors related to main contractors	3.76	4.17	-3.187	0.002*
Factors related to subcontractors	3.75	4.11	-2.591	0.011*
Subcontractors management success factors	3.71	4.02	-2.684	0.008*
The effect of subcontractors management in saving the project cost and time	3.69	3.79	-0.670	0.504
The barriers for the good performance of subcontractor’s team	3.58	3.79	-1.582	0.117
All items of the questionnaire	**3.68**	**3.96**	**-2.539**	**0.013***

* The mean difference is significant a 0.05 level

4.4.1 Hypotheses related to main contractor

Hypothesis 1: *H0: There is a significant difference among the respondents toward CSFs for subcontractors management in construction projects in the Gaza strip due to classification category of the company at significance level α = 0.05*

In order to test this hypothesis One Way ANOVA statistical test is used to provide the research with valuable results. The results illustrated in Table 4.31 show that the p-value (Sig.) is greater than the level of significance α = 0.05 for the group 7 "Factors related to main contractors and Factors related to subcontractors", so the null hypothesis can be rejected (H0 is not accepted), which means that there is no significant difference among the respondents toward these groups due to classification category of the company. It is concluded that classification category of the company has no effect on this fields.

For the other groups as shown in the table below, the p-value (Sig.) is smaller than the level of significance α = 0.05, so the null hypothesis can't be rejected (H0 is accepted), which means that there is significant difference among the respondents toward these groups due to classification category of the company. It is concluded that the classification category of the company has an effect on the other groups.

Table 4.31: ANOVA test of the fields and their p-values for classification category of the company

Field	Means			Test Value	Sig.
	Category 1	Category 2	Category 3		
Factors related to project's issues	3.76	3.24	2.46	7.821	0.001*
Factors related to contract documents & management	3.75	3.38	2.87	4.317	0.017*
Factors pertaining to project staff in general	3.78	3.33	2.70	5.121	0.008*
Factors pertaining to project manager	3.98	3.44	3.33	4.214	0.018*
Factors related to main contractors	3.86	3.49	3.49	2.225	0.115
Factors related to subcontractors	3.83	3.53	3.48	1.385	0.256
Subcontractors management success factors	3.83	3.42	3.13	4.645	0.012*
The effect of subcontractors management in saving the project cost and time	3.79	3.51	2.59	4.795	0.011*
The barriers for the good performance of subcontractor's team	3.66	3.54	2.13	8.816	0.000*
All items of the questionnaire	**3.79**	**3.44**	**2.89**	**6.278**	**0.003***

* The mean difference is significant a 0.05 level

Hypothesis 2: *H0: There is a significant difference among the respondents toward CSFs for subcontractors management in construction projects in the Gaza strip due to years of experience of the company at significance level α = 0.05*

In order to test this hypothesis One Way ANOVA statistical test is used to provide the research with valuable results. The results illustrated in Table 4.32 show that the p-value (Sig.) is smaller than the level of significance α = 0.05 for the groups "Factors related to project's issues, The effect of subcontractors management in saving the project cost and time and The barriers for the good performance of subcontractor's team", so the null hypothesis can't be rejected (H0 is accepted), which means that there is a significant difference among the respondents toward these groups due to years of experience of the company. It is concluded that the years of experience of the company has an effect on this groups.

For the other groups as shown in the table below, the p-value (Sig.) is greater than the level of significance α = 0.05, so the null hypothesis can be rejected (H0 is not accepted), which means that there is no significant difference among the respondents toward other groups due to years of experience of the company. It is concluded that the years of experience of the company has no effect on the other groups.

Table 4.32: ANOVA test of the fields and their p-values for Years of experience of the company

Field	Means				Test Value	Sig.
	less than 5 years	5-10 years	11-15 years	more than 15 years		
Factors related to project's issues	3.47	3.23	3.62	3.81	2.914	0.040*
Factors related to contract documents & management	3.58	3.38	3.77	3.73	1.393	0.251
Factors pertaining to project staff in general	3.51	3.51	3.67	3.73	0.450	0.718
Factors pertaining to project manager	3.60	3.57	3.96	3.98	1.611	0.194
Factors related to main contractors	3.66	3.58	3.85	3.85	0.800	0.498
Factors related to subcontractors	3.71	3.65	3.80	3.80	0.212	0.888
Subcontractors management success factors	3.61	3.49	3.79	3.82	1.374	0.257
The effect of subcontractors management in saving the project cost and time	3.52	3.23	3.83	3.89	4.067	0.010*
The barriers for the good performance of subcontractor's team	3.34	3.21	3.83	3.70	3.544	0.019*
All items of the questionnaire	**3.53**	**3.43**	**3.80**	**3.80**	**2.340**	**0.080**

* The mean difference is significant a 0.05 level

Hypothesis 3: *H0: There is a significant difference among the respondents toward CSFs for subcontractors management in construction projects in the Gaza strip due to location of the company at significance level* $\alpha = 0.05$

In order to test this hypothesis One Way ANOVA statistical test is used to provide the research with valuable results. The results illustrated in Table 4.33 show that the p-value (Sig.) is greater than the level of significance $\alpha = 0.05$ for each field, so the null hypothesis can be rejected (H0 is not accepted), which means that there is no significant difference in respondents' answers toward each group due to location of the company. It is concluded that the characteristic of the location of the company has no effect on each group.

Table 4.33: ANOVA test of the fields and their p-values for Location of the company

Field	Means				Test Value	Sig.
	North of Gaza	Gaza	Middle area	South of Gaza		
Factors related to project's issues	3.26	3.62	3.67	3.70	0.649	0.586
Factors related to contract documents & management	3.67	3.58	3.81	3.78	0.455	0.714
Factors pertaining to project staff in general	3.80	3.57	3.57	4.04	1.121	0.346
Factors pertaining to project manager	3.79	3.74	4.02	4.26	1.360	0.261
Factors related to main contractors	3.86	3.67	4.08	3.93	1.251	0.297
Factors related to subcontractors	3.79	3.69	3.94	3.90	0.441	0.724
Subcontractors management success factors	3.71	3.65	3.89	3.92	0.743	0.530
The effect of subcontractors management in saving the project cost and time	3.62	3.62	3.95	3.85	0.690	0.561
The barriers for the good performance of subcontractor’s team	3.58	3.53	3.63	3.77	0.338	0.798
All items of the questionnaire	3.66	3.63	3.85	3.89	0.805	0.495

* The mean difference is significant a 0.05 level

Hypothesis 4: *H0: There is a significant difference among the respondents toward CSFs for subcontractors management in construction projects in the Gaza strip due to position of the person filling the questionnaire at significance level α = 0.05*

In order to test this hypothesis One Way ANOVA statistical test is used to provide the research with valuable results. The results illustrated in Table 4.34 show that the p-value (Sig.) is greater than the level of significance α = 0.05 for the groups "factors related to contract documents & management, factors pertaining to project staff in general and factors related to subcontractors", so the null hypothesis can be rejected (H0 is not accepted), which means that there is no significant difference among the respondents toward these groups due to position of the person filling the questionnaire. It is concluded that the characteristics of the position of the person filling the questionnaire have no effect on these groups.

For the other groups as shown in the table below, the p-value (Sig.) is smaller than the level of significance α = 0.05, so the null hypothesis can't be rejected (H0 is accepted), which means that there is significant difference among the respondents toward these groups due to position of the person filling the questionnaire. It is concluded that the characteristics of the position of the person filling the questionnaire have an effect on the other groups.

Table 4.34: ANOVA test of the fields and their p-values for Position of the person filling the questionnaire

Field	Means					Test Value	Sig.
	Project manager	Office engineer	Site engineer	Company's owner	Other		
Factors related to project's issues	4.00	3.59	3.43	3.53	4.88	2.860	0.029*
Factors related to contract documents & management	3.85	3.73	3.52	3.54	4.92	1.870	0.125
Factors pertaining to project staff in general	3.90	3.84	3.47	3.72	5.00	2.184	0.079
Factors pertaining to project manager	4.28	3.62	3.67	4.26	4.78	3.157	0.019*
Factors related to main contractors	4.15	3.65	3.59	4.40	4.79	4.082	0.005*
Factors related to subcontractors	4.07	3.76	3.59	4.19	4.55	2.188	0.078
Subcontractors management success factors	4.05	3.69	3.55	3.98	4.80	3.408	0.013*
The effect of subcontractors management in saving the project cost and time	4.10	3.50	3.54	3.65	5.00	3.203	0.018*

The barriers for the good performance of subcontractors	3.96	3.55	3.49	2.27	4.79	6.871	0.000*
All items of the questionnaire	4.04	3.65	3.54	3.66	4.82	4.087	0.005*

* The mean difference is significant a 0.05 level

Hypothesis 5: *H0: There is a significant difference among the respondents toward CSFs for subcontractors management in construction projects in the Gaza strip due to years of experience of the person filling the questionnaire at significance level α = 0.05*

In order to test this hypothesis One Way ANOVA statistical test is used to provide the research with valuable results. The results illustrated in Table 4.35 show that the p-value (Sig.) is greater than the level of significance α = 0.05 for the group "The barriers for the good performance of subcontractor's team", so the null hypothesis can be rejected (H0 is not accepted), which means that there is no significant difference among the respondents toward these group due to years of experience of the person filling the questionnaire. It is concluded that the personal characteristics' Years of experience of the person filling the questionnaire have no effect on this group of factors.

For the other groups as shown in the table below, the p-value (Sig.) is smaller than the level of significance α = 0.05, so the null hypothesis can't be rejected (H0 is accepted), which means that there is significant difference among the respondents toward these groups due to years of experience of the person filling the questionnaire. It is concluded that the personal characteristics' Years of experience of the person filling the questionnaire have an effect on these groups of factors.

Table 4.35 :ANOVA test of the fields and their p-values for Years of experience of the person filling the questionnaire

Field	Means				Test Value	Sig.
	less than 5 yrs.	5-10 years	11-15 years	more than 15 yrs.		
Factors related to project's issues	3.46	3.35	4.03	4.13	5.659	0.001*
Factors related to contract documents & management	3.42	3.56	3.70	4.16	3.912	0.012*
Factors pertaining to project staff in general	3.43	3.51	3.86	4.17	3.645	0.016*
Factors pertaining to project manager	3.57	3.65	4.22	4.47	6.508	0.001*
Factors related to main contractors	3.66	3.51	4.16	4.28	6.704	0.000*
Factors related to subcontractors	3.70	3.52	4.12	4.13	3.558	0.018*
Subcontractors management success factors	3.55	3.52	4.02	4.22	6.490	0.001*
The effect of subcontractors management in saving the project cost and time	3.31	3.69	3.93	4.11	4.180	0.009*
The barriers for the good performance of subcontractor's team	3.33	3.54	3.96	3.74	2.529	0.064
All items of the questionnaire	3.49	3.54	4.00	4.13	6.488	0.001*

* The mean difference is significant a 0.05 level

Hypothesis 6: *H0: There is a significant difference among the respondents toward CSFs for subcontractors management in construction projects in the Gaza strip due to number of fixed-term management employees in the company at significance level α = 0.05*

In order to test this hypothesis One Way ANOVA statistical test is used to provide the research with valuable results. The results illustrated in Table 4.36 show that the p-value (Sig.) is greater than the level of significance α = 0.05 for each group of factors, so the null hypothesis can be rejected (H0 is not accepted), which means that there is no significant difference in respondents' answers toward each group due to number of fixed-term management employees in the company. It is concluded that the characteristic of the number of fixed-term management employees in the company has no effect on each group of factors.

Table 4.36: ANOVA test of the fields and their p-values for Number of fixed-term management employees in the company

Field	Means				Test Value	Sig.
	less than 5	5-10	11-15	more than 15		
Factors related to project's issues	3.71	3.58	3.41	3.65	0.358	0.783
Factors related to contract documents & management	3.81	3.45	3.97	3.77	2.416	0.073
Factors pertaining to project staff in general	3.79	3.60	3.63	3.48	0.430	0.732
Factors pertaining to project manager	3.98	3.65	4.10	4.16	1.866	0.142
Factors related to main contractors	3.90	3.62	3.88	4.08	1.599	0.197
Factors related to subcontractors	3.81	3.58	4.07	4.22	2.560	0.061
Subcontractors management success factors	3.84	3.57	3.87	3.93	1.511	0.219
The effect of subcontractors management in saving the project cost and time	3.50	3.79	4.01	3.29	2.065	0.112
The barriers for the good performance of subcontractor's team	3.50	3.61	3.80	3.34	0.728	0.539
All items of the questionnaire	3.75	3.60	3.87	3.77	0.796	0.500

* The mean difference is significant a 0.05 level

Hypothesis 7: *H0: There is a significant difference among the respondents toward CSFs for subcontractors management in construction projects in the Gaza strip due to number of fixed-term workers and technicians in the company at significance level α = 0.05*

In order to test this hypothesis One Way ANOVA statistical test is used to provide the research with valuable results. The results illustrated in Table 4.37 show that the p-value (Sig.) is smaller than the level of significance α = 0.05 for the group "Factors pertaining to project manager", so the null hypothesis can't be rejected (H0 is accepted), which means that there is significant difference among the respondents toward this group due to number of fixed-term workers and technicians in the company. It is concluded that the personal characteristics' number of fixed-term workers and technicians in the company has an effect on this group of factors.

For the other groups as shown in table below, the p-value (Sig.) is greater than the level of significance α = 0.05, so the null hypothesis can be rejected (H0 is not accepted), which means that there is no significant difference among the respondents toward these groups due to number of fixed-term workers and technicians in the company. It is concluded that the personal characteristics number of fixed-term workers and technicians in the company has no effect on the other groups.

Table 4.37: ANOVA test of the fields and their p-values for Number of fixed-term workers and technicians in the company

Field	Means				Test Value	Sig.
	less than 5	5-10	11-15	more than 15		
Factors related to project's issues	3.62	3.45	3.98	3.65	1.559	0.206
Factors related to contract documents & management	3.72	3.44	3.67	3.91	2.268	0.087
Factors pertaining to project staff in general	3.82	3.57	3.76	3.60	0.428	0.734
Factors pertaining to project manager	3.90	3.57	4.14	4.11	3.166	0.029*
Factors related to main contractors	3.77	3.57	4.00	3.97	2.170	0.099
Factors related to subcontractors	3.66	3.59	3.93	3.99	1.642	0.187
Subcontractors management success factors	3.74	3.53	3.91	3.90	2.137	0.103
The effect of subcontractors management in saving the project cost and time	3.90	3.44	3.97	3.82	2.524	0.064
The barriers for the good performance of subcontractor's team	3.60	3.47	3.87	3.56	1.065	0.369
All items of the questionnaire	3.73	3.51	3.91	3.83	2.265	0.088

* The mean difference is significant a 0.05 level

4.4.2 Hypotheses related to subcontractor

Hypothesis 1: *H0: There is a significant difference among the respondents toward CSFs for subcontractors management in construction projects in the Gaza strip due to specialty of subcontractor at significance level α = 0.05*

In order to test this hypothesis One Way ANOVA statistical test is used to provide the research with valuable results. The results illustrated in Table 4.38 show that the p-value (Sig.) is smaller than the level of significance α = 0.05 for the group "Factors related to project's issues", so the null hypothesis can't be rejected (H0 is accepted), which means that there is significant difference among the respondents toward this group due to specialty of subcontractor. It is concluded that the personal characteristics' specialty of subcontractor has an effect on this group.

For the other groups as shown in table below, the p-value (Sig.) is greater than the level of significance α = 0.05, so the null hypothesis can be rejected (H0 is not accepted), which means that there is no significant difference among the respondents toward these groups due to specialty of subcontractor. It is concluded that the personal characteristics' specialty of subcontractor has no effect on these groups.

Table 4.38: ANOVA test of the fields and their p-values for Specialty of Subcontractor

Field	Means								Test Value	Sig.
	Shuttering	Building	Plastering	Tiling	Painting	Mechanic	Electrical	Others		
Factors related to project's issues	3.67	3.63	2.57	4.13	3.58	3.76	3.11	3.79	2.469	0.047*
Factors related to contract documents & management	4.17	3.87	4.02	4.46	3.83	3.84	3.69	4.14	1.319	0.284
Factors pertaining to project staff in general	4.50	4.33	4.03	4.17	3.83	3.83	4.39	3.88	0.749	0.634
Factors pertaining to project manager	4.22	4.26	4.09	4.22	4.06	4.28	4.56	4.15	0.615	0.738
Factors related to main contractors	4.33	4.56	4.24	4.20	3.82	4.07	4.38	4.05	1.444	0.234
Factors related to subcontractors	4.23	4.61	3.91	4.18	3.79	3.93	4.15	4.22	1.240	0.321
Subcontractors management success factors	4.19	4.23	3.86	4.24	3.82	3.96	4.04	4.06	0.977	0.471

The effect of subcontractors management in saving the project cost and time	3.78	4.11	3.18	4.44	3.31	3.86	4.37	3.97	1.190	0.345
The barriers for the good performance of subcontractor's team	3.67	3.98	3.75	4.00	3.40	3.98	3.69	3.93	0.417	0.882
All items of the questionnaire	4.06	4.17	3.77	4.22	3.69	3.96	4.02	4.03	0.894	0.527

* The mean difference is significant a 0.05 level

Hypothesis 2: *H0: There is a significant difference among the respondents toward CSFs for subcontractors management in construction projects in the Gaza strip due to location of the subcontractor's company at significance level α = 0.05*

In order to test this hypothesis One Way ANOVA statistical test is used to provide the research with valuable results. The results illustrated in Table 4.39 show that the p-value (Sig.) is smaller than the level of significance α = 0.05 for the group "Factors related to contract documents & management", so the null hypothesis can't be rejected (H0 is accepted), which means that there are significant difference among the respondents toward this group due to location of the subcontractor's company. We conclude that the Location of the subcontractor's company has an effect on this group.

For the other groups as shown below, the p-value (Sig.) is greater than the level of significance α = 0.05, so the null hypothesis can be rejected (H0 is not accepted), which means that there are no significant difference among the respondents toward these groups due to location of the subcontractor's company. It is concluded that the location of the subcontractor's company has no effect on these groups.

Table 4.39: ANOVA test of the fields and their p-values for Location of the subcontractor's Company

Field	Means				Test Value	Sig.
	North of Gaza	Gaza	Middle area	South of Gaza		
Factors related to project's issues	4.27	3.56	3.25	3.28	1.351	0.278
Factors related to contract documents & management	4.38	3.87	4.67	4.05	3.674	0.024*
Factors pertaining to project staff in general	4.58	4.08	3.17	4.04	1.274	0.302
Factors pertaining to project manager	4.56	4.23	3.78	4.15	1.337	0.282
Factors related to main contractors	4.68	4.10	3.80	4.22	1.867	0.158
Factors related to subcontractors	4.68	4.05	4.09	4.11	1.239	0.314
Subcontractors management success factors	4.53	3.98	3.89	4.00	2.447	0.085
The effect of subcontractors management in saving the project cost and time	4.61	3.75	4.33	3.67	1.019	0.399
The barriers for the good performance of subcontractor's team	4.77	3.71	4.15	3.72	2.428	0.086
All items of the questionnaire	4.58	3.91	3.98	3.92	2.752	0.061

* The mean difference is significant a 0.05 level

Hypothesis 3: *H0: There is a significant difference among the respondents toward CSFs for subcontractors management in construction projects in the Gaza strip due to years of experience of the subcontractor at significance level α = 0.05.*

In order to test this hypothesis One Way ANOVA statistical test is used to provide the research with valuable results. The results illustrated in Table 4.40 show that the p-value (Sig.) is greater than the level of significance α = 0.05 for each group, so the null hypothesis can be rejected (H0 is not accepted), which means that there are no significant difference in respondents' answers toward each group due to years of experience of the subcontractor. It is concluded that the characteristic of the years of experience of the subcontractor has no effect on each group.

Table 4.40: ANOVA test of the fields and their p-values for years of experience of the subcontractor

Field	Means				Test Value	Sig.
	less than 5 years	5-10 years	11-15 years	more than 15 years		
Factors related to project's issues	4.06	3.22	3.62	3.42	0.647	0.591
Factors related to contract documents & management	4.35	3.50	3.92	4.02	2.470	0.083
Factors pertaining to project staff in general	4.58	3.92	3.86	4.09	0.757	0.528
Factors pertaining to project manager	4.06	4.17	4.31	4.19	0.314	0.815
Factors related to main contractors	4.13	4.10	4.17	4.18	0.033	0.992
Factors related to subcontractors	4.00	4.14	4.03	4.14	0.125	0.944
Subcontractors management success factors	4.17	3.85	4.01	4.03	0.385	0.765
The effect of subcontractors management in saving the project cost and time	3.72	4.17	3.80	3.76	0.156	0.925
The barriers for the good performance of subcontractor’s team	3.57	3.60	3.82	3.82	0.178	0.910
All items of the questionnaire	4.02	3.84	3.95	3.97	0.098	0.960

* The mean difference is significant a 0.05 level

Hypothesis 4: *H0: There is a significant difference among the respondents toward CSFs for subcontractors management in construction projects in the Gaza strip due to staff of the subcontractor at significance level α = 0.05.*

In order to test this hypothesis One Way ANOVA statistical test is used to provide the research with valuable results. The results illustrated in Table 4.41 show that the p-value (Sig.) is smaller than the level of significance α = 0.05 for the group "The barriers for the good performance of subcontractor's team", so the null hypothesis can't be rejected (H0 is accepted), which means that there are significant difference among the respondents toward this group due to staff of the subcontractor. It is concluded that the number of staff of the subcontractor has an effect on this group.

For the other groups as shown below, the p-value (Sig.) is greater than the level of significance α = 0.05, so the null hypothesis can be rejected (H0 is not accepted), which means that there are no significant difference among the respondents toward these groups due to staff of the subcontractor. It is concluded that the number of staff of the subcontractor has no effect on the other groups.

Table 4.41: ANOVA test of the fields and their p-values for Staff of the Subcontractor

Field	Means			Test Value	Sig.
	5-10	11-15	more than 15		
Factors related to project's issues	3.61	3.03	3.62	2.038	0.149
Factors related to contract documents & management	4.09	3.86	3.97	1.085	0.351
Factors pertaining to project staff in general	4.10	3.88	4.14	0.425	0.658
Factors pertaining to project manager	4.31	4.05	4.19	1.310	0.285
Factors related to main contractors	4.25	4.05	4.16	0.612	0.549
Factors related to subcontractors	4.05	4.09	4.18	0.254	0.777
Subcontractors management success factors	4.09	3.85	4.05	1.520	0.236
The effect of subcontractors management in saving the project cost and time	3.74	3.41	4.07	1.729	0.195
The barriers for the good performance of subcontractor's team	4.09	3.35	3.73	4.523	0.020*
All items of the questionnaire	4.05	3.72	4.00	2.413	0.107

* The mean difference is significant a 0.05 level

4.5 Chapter four conclusion

The findings presented in this chapter have summarized the opinions of experts in interviews and opinions of respondents in a structured questionnaire.

Ten experts of contractors and subcontractors were invited to answer the questions of the interview about the CSF affecting on the subcontractors management in the construction projects in the Gaza Strip, which related to project's issues or General conditions surrounding the project, contract documents & management, project manager, main contractors and subcontractors, also answer the questions about the impact of the subcontractors' management on the factors of cost and time of the project, and finally about the barriers for the good performance of subcontractor's team in the construction project.

The questionnaire contained three main sections as follow: (1) Subcontractors management success factors; (2) The effect of subcontractors' management in saving the project cost and time; and (3) the barriers for the good performance of subcontractor's team.

Section one about the CSFs affecting the subcontractors' management contained six main groups of factors as follow: factors related to project's issues, factors related to contract documents & management, factors pertaining to project staff in general, factors pertaining to project manager, factors related to main contractors and factors related to subcontractors. The six groups included 63 influential factors. Section two contained nine factors and the final section contained 15 factors. The questionnaire has been filled by 110 respondents.

The results indicated the most effect group of success factors groups affecting the subcontractors' management is the group of factors pertaining to project manager. The CSFs affecting the subcontractors' management in the construction industry from the perspective of the contractors' respondents are: Manager Personality & his experience, Quality and clarity of design drawing and shop drawings, Practical and technical ability of the main contractors, Financial ability & strength of the main contractors and Government policy, market condition & political situation. On the other hand from the perspective of subcontractors are: Qualified supervisory staff, Collaboration between the staff of the project, Manager Personality & his experience, financial ability & strength of the main contractors and the clarity of the contract between contractors and subcontractors.

On the other hand, the results indicated the most important factors affecting cost and time saving from the perspective of the contractors' respondents are: Overhead percentage of project, planned time for project construction, cost of variation orders and project labor cost. And from the perspective of the subcontractors' respondents are: planned time for project construction, waste rate of materials, overhead percentage of project and time needed to implement variation orders.

On the other hand, the results indicated the most critical factors that hinder to access good performance from the perspective of the contractors' respondents are: Low price

of the subcontractor's contract and low percentage of the profit, the duration that allocated for the subcontractor's activities commensurate with the size of work, Low number of experienced site supervisory staff, bad communication between contractors and subcontractors. And from the perspective of the subcontractors' respondents are: lack of subcontractor equipment to finish his/her work, low number of experienced site supervisory staff, low price of the subcontractor's contract and low percentage of the profit and bad collaboration between project staff.

CHAPTER 5 . CONCLUSION & RECOMMENDATIONS

The main aim of this research is to improve the management of construction projects through improving the management of subcontractors in construction projects in the Gaza Strip. The research also aims to formulate practical recommendations to improve subcontractors' management in the construction projects in the Gaza Strip.

This chapter contains a summary of the study, conclusion, recommendations and suggestions for further research that would help in improving the management of the subcontractors in the construction project in the Gaza Strip. The first objective of the study was to identify CSFs affecting the subcontractors' management in the construction project. The second objective was to investigate the effect of subcontractors' management in saving the project cost and time. The third objective was to investigate the barriers for the good performance of subcontractors.

5.1 Conclusion

This part of the thesis concludes the main findings of the research per objective, based on the opinions of the respondents as follows:

The study found that the most important groups of success factors affecting subcontractors' management in construction project in the Gaza Strip according to the point of view of contractors, subcontractors as follow: factors related to project manager, factors related to main contractors, factors related to subcontractors, factors pertaining to project staff in general, factors related to contract documents & management and factors related to project's issues.

The findings of the study indicate that the critical success factors (CSFs) affecting the subcontractors' management in the construction industry in the Gaza Strip according to the point of view of contractors, subcontractors are: manager personality & his/her experience, quality and clarity of design drawing and shop drawings, financial ability & strength of the main contractors, practical and technical ability of the main contractors, government policy, market condition & political situation, qualified supervisory staff, manager personality & his experience and the clarity of the contract between contractors and subcontractors.

The study finding indicate that the most important factors of subcontractors' management affecting in saving the project time and cost according to the point of view of contractors, subcontractors are: overhead percentage of project, planned time for project construction, cost of variation orders, project labor cost and waste rate of materials.

The study illustrates that the most important factors that prevent to access a good performance of the subcontractors' team in the construction projects according to the point of view of contractors, subcontractors are: low price of the subcontractor's contract and low percentage of the profit, the duration that allocated for the subcontractor's activities commensurate with the size of work, low number of

experienced site supervisory staff, bad communication between contractors and subcontractors and low salary for workers of subcontractor's team.

5.2 Recommendation

5.2.1 Recommendations to main contractors and subcontractors

It is recommended to give special attention to the following factors:

- It is recommended for the contractor to select the project manager who has a strong personality and a high experience in the construction industry to be able to manage the subcontractors effectively in the project.
- It is recommended that the drawing and specifications for the project must be clear to all members of the project and all inclusive for all project activities.
- Main contractors should have a good financial capacity to be able to issue the financial payments to the subcontractor on the due time, since this ensures good reputation of the contractor and enable the subcontractor to cover his expenses, purchase the required materials and pay for the labors on time, which results in completing the works on time without delay.
- It is recommended to choose the main contractor who have a good practical and technical ability and have a high experience, history and reputation in the construction sector.
- Changing the practice of the "lowest bid" to an approach which incorporates both price and technical performance.
- Contractors are recommended to coordinate among all the subcontractors in the project in order to prevent scheduling conflict and have ability to control all activities in the project.
- It is recommended that the contract between contractors and subcontractors and the contract between the client and the main contractor must be clear and inclusive all issues that could occur in the future to avoid any problem may occur in the future.
- Subcontractors are recommended to employ sufficient number of qualified technical staff with relevant experience of the project and to prepare all required materials and equipment in order to be able to adhere to subcontract requirements and time schedule
- Subcontractors are recommended to communicate and collaborate with the contractor and site engineers effectively and implement their instructions to avoid any problems.
- Subcontractors should not to accept subcontracts which are weak in financial, so as not to affect the quality of the work, therefore not to hinder the management of the subcontractors in the project.
- Subcontractors are recommended to propose suitable and reasonable prices that ensure acceptable margin of profit.

- Subcontractors are recommended to adhere to quality standards and subcontract requirement through using experienced labors, good materials, supervision of materials and labors, implementing the engineer's instructions and doing the remedial works.
- The duration that allocated for the subcontractor's activities should commensurate with the size of work.
- In the construction project there must be a sufficient number of experienced site supervisory staff.
- Contractors are recommended to identify all responsibilities of subcontractors in the written contracts, to keep the rights of all parties.
- If changes are made to the plan which are relevant to the work the subcontractor is doing, the principal contractor must make sure the subcontractor gets a copy of the relevant changes.
- Main contractor should obtain written approval from the supervisor to subcontract any part of the work to be done
- Main contractor should monitor the performance of subcontractors to make sure they are following their safe work method statements and complying with drawing, specifications, contract conditions and regulation and to ensure completing the works according to the time schedule and achieve the best quality.
- Subcontractors must give the main contractor any additional information they have about his work before start the work at a construction site.

5.2.2 Recommendations for future research

- Developing a model to evaluate and select subcontractors.
- Developing a model to managing the subcontractors in the construction project.
- Developing a system to classify the subcontractors similar to the classification of the main contractors.

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ANNEX 1: QUESTIONNAIRE IN ENGLISH

The Islamic University - Gaza
Higher Education Deanship
Faculty of Engineering

Questionnaire for

CRITICAL SUCCESS FACTORS FOR SUBCONTRACTORS MANAGEMENT IN CONSTRUCTION PROJECTS IN THE GAZA STRIP

Researcher: Mohammed Hassan Shehada

Supervisor: **Dr. Nabil I. El Sawalhi**

Doctor of Construction Engineering and Management

Gaza,

Nov, 2014

Questionnaire for Contractors & subcontractors

In the Gaza Strip

Critical success factors for Subcontractors management in Construction projects in the Gaza strip

Dear Sir

To start, I would like to present my appreciation and thanks to you for taking part of your time and effort to complete this questionnaire.

This questionnaire aims to study the critical success management factors for subcontractors in the construction industry at Gaza Strip.

This is a part of partial of the requirements for degree of Master of Science in the field of Construction Management at the Islamic University, for the researcher Eng. / Mohammed Shehada under the supervision on **Dr. / Nabil. I. El Sawalhi**

In appreciations for your participation in this questionnaire, we will show you the results of this study.

All information in the questionnaire will be used for research with complete commitment for absolute secrecy to your information.

Questionnaire contents:

This questionnaire is divided into four main sections:

1. Company Profile.
2. Subcontractors management success factors:
3. The effect of subcontractors' management in saving the project cost and time.
4. The barriers for the good performance of subcontractor's team.

Thank you for your cooperation.

Researcher Eng**. / Mohammed Shehada**
November 2014
For any questions, please call Mobile No.: 0599668218, Email: mhfsh_2010@hotmail.com

Section One: General Information
For Main Contractor

1. Classification Category of the Company :

   ☐ Category 1 ☐ Category 2 ☐ Category 3 ☐ Category 4

2. Years of experience of the company

   ☐ Less than 5 years ☐ 5-10 years ☐ 11-15 years ☐ more than 15 years

3. Location of the company

   ☐ North of Gaza ☐ Gaza ☐ Middle area ☐South of Gaza

4. Position of the person filling the questionnaire:

   ☐Project manager ☐Office engineer ☐Site engineer ☐Company's owner

   ☐Other

5. Years of experience of the person filling the questionnaire:

   ☐ Less than 5 years ☐ 5-10 years ☐ 11-15 years ☐ more than 15 years

6. Number of fixed-term management employees in the company

   ☐ Less than 5 ☐ 5-10 ☐ 11-15 ☐ more than 15

7. Number of fixed-term workers and technicians in the company

   ☐ Less than 5 ☐ 5-10 ☐ 11-15 ☐ more than 15

For the Subcontractor

1. Specialty of Subcontractor

   ☐Shuttering ☐Building ☐Plastering ☐Tiling

   ☐Painting ☐Mechanic ☐Electrical ☐Others (-----)

2. Location of the subcontractor's Company

   ☐ North of Gaza ☐ Gaza ☐ Middle area ☐South of Gaza

3. Years of experience of the subcontractor

   ☐ Less than 5 years ☐ 5-10 years ☐ 11-15 years ☐ more than 15 years

4. Staff of the Subcontractor

   ☐ Less than 5 ☐ 5-10 ☐ 11-15 ☐ more than 15

Section two: Subcontractors management success factors

Put your opinion about degree of importance of these factors on the subcontractors' management: **(Please check the appropriate choice in the following items)**

S. No.	Success Factors Affecting on the Subcontractors' Management	Least important	Not Important	Moderate	important	Very important
1	**Factors related to project's issues**					
1.1	The presence of the project in a densely populated place					
1.2	Project life cycle schedule is a deliberate and difficult implementation					
1.3	Large/complex project					
1.4	Increase the additional work for the project from the limit set in the contract					
1.5	Remote location (difficult accessibility to the site)					
1.6	There is no contingency budget to proceed works					
1.7	Increasing the fundamental changes in the nature of works					
1.8	Many execution obstacles					
1.9	Government policy, market condition & political situation					
2	**Factors related to contract documents & management**					
2.1	Implementing the lowest bid price system					
2.2	Selection of subcontractors through competitive strategy & taking the lowest price as the only criteria for selection					
2.3	Assisting the main contractors in pricing the tender by the subcontractors					
2.4	The subcontractors id preferred to be company registered in contractors union					
2.5	Clear understanding of the contract conditions and requirements, project objectives and implementation methods by the contractors and subcontractors					
2.6	The clarity of the contract between contractors and subcontractors					
2.7	Delays in the adoption of change orders					
2.8	Compliance with regulations by the contractors & subcontractors					
2.9	Adherence to subcontract requirements					
2.10	Quality and clarity of design drawing and shop drawings					
2.11	Payment method to the main contractor by the client					
2.12	Insurance terms, interest rate and bond/loan terms					

S. No.	Success Factors Affecting on the Subcontractors' Management	Least important Not Important	Moderate	important	Very important
2.13	The extent of application of quality system in the project					
3	**Factors pertaining to project staff in general**					
3.1	The lack of the efficiency, qualification and skills of the project team					
3.2	Morally support the project staff					
3.3	Preparation of training courses qualify the project staff to work on-site					
3.4	Number of craftsmen and laborers in the project					
3.5	Qualified supervisory staff					
3.6	Collaboration between the staff of the project					
4	**Factors pertaining to project manager**					
4.1	Manager personality & his experience					
4.2	Salary of the managers					
4.3	Management level leadership					
4.4	Regular and effective communication & coordination with main contractor and subcontractors by the project manager					
4.5	Managers should realize the other construction activities related to subcontractors tasks to ensure the continuity of the work of subcontractors					
4.6	Coordination between all subcontractors working in the same project					
4.7	Ability to undertake the size of work by the project manager					
4.8	Monitor subcontractors' work process to ensure they are doing things according to plan and method statements					
4.9	Project manager should obtain written approval from consultant for any work before start					
5	**Factors related to main contractors**					
5.1	Previous experience, history and reputation of the main contractors					
5.2	Practical and technical abil8lity of the main contractors					
5.3	Contractors performance of relevant previous projects					
5.4	Financial ability & strength of the main contractors					
5.5	Ability in dealing with uncertainty in the construction projects					

S. No.	Success Factors Affecting on the Subcontractors' Management	Least important	Not important	Moderate	Important	Very important
5.6	Controlling and follow up of subcontractors activities by main contractor's engineers					
5.7	Financial facilitation to subcontractors to be able to purchase the materials and equipment					
5.8	Main contractor should give a subcontractors management work plan before start the work					
5.9	Providing subcontractors location services and work requirements					
5.10	Make sure that the subcontractors' price fit to quality and specifications					
5.11	Commitment of the main contractors with project schedule					
5.12	Ability in bearing the risk in case payment delay from the client					
5.13	Bearing responsibility in case of accidents					
5.14	Relationship with subcontractor/client/consultant					
5.15	Lack of trust between main contractors and subcontractors					
6	**Factors related to subcontractors**					
6.1	Size of subcontractors' staff					
6.2	Previous experience, history and reputation of the subcontractors					
6.3	Practical and technical ability of the subcontractors					
6.4	Financial ability & strength of the subcontractors					
6.5	Performance of relevant previous projects					
6.6	Subcontractor familiarity with the nature of the required tests for its own work and materials supplied by him.					
6.7	The extent of the subcontractor's commitment to the specifications and quality of the project					
6.8	The extent of the subcontractor's commitment to the project's schedule					
6.9	Close control over the cost by the subcontractors					
6.10	Prompt payment to labourers					
6.11	Providing adequate information/conditions to main contractor					

Section three: The effect of subcontractors' management in saving the project cost and time.

Put your opinion about degree of impact of the subcontractors management related to these factors of cost and time of the project **(Please check the appropriate choice in the following items)**

S. No.	**The effect of subcontractors management in saving the project cost and time.**	Least important	Not important	Moderate	Important	Very important
1	Profit rate of project					
2	Material and equipment cost					
3	Project labor cost					
4	Waste rate of materials					
5	Cost of variation orders					
6	Planned time for project construction					
7	Time needed to implement variation orders					
8	Time needed to rectify defects					
9	Overhead percentage of project					

Section four: the barriers for the good performance of subcontractor's team:

Put your opinion about degree of impact of these factors on the subcontractor's performance in the construction project **(Please check the appropriate choice in the following items)**

S. No.	**Factors affect the subcontractor good performance**	Least important	Not important	Moderate	Important	Very important
1	The duration that allocated for the subcontractor's activities commensurate with the size of work					
2	Lack of good construction technique					
2	Low salary for workers of subcontractor's team					
3	Low price of the subcontractor's contract and low percentage of the profit					
4	Bad collaboration between project staff					
5	Low number of experienced site supervisory staff					
7	Weak compliance with general and contractual obligation					
8	Bad communication between contractors and subcontractors					
9	No safety approach used by site manager					
10	No facilitate the arrivals of subcontractor's team to the project site					
11	Lack of subcontractor equipment to finish his work					
12	unfamiliarity of work and location					
13	Unsuitable working environment					
14	Unsafe working environment					
15	Non ability to control duration					

ANNEX 2: QUESTIONNAIRE IN ARABIC

الجامعــة الإسلاميــة ــ غــزة

كليـــــة الدراســـــات العليـــا

إدارة المشــروعات الهندسيـة

ا ستـبـيـا ن حـو ل

" عوامل النجاح المهمة لإدارة المقاولين من الباطن في المشاريع الإنشائية في قطاع غزة"

وذلك جزء من البحث التكميلي لنيل درجة الماجستير في إدارة المشروعات الهندسية

الباحث / م. محمد حسن شحادة

المشرف / د. نبيـــل الصوالحـــي

2014 م

بسم الله الرحمن الرحيم

السادة الكرام/

السلام عليكم ورحمة الله وبركاته وبعد، ،،

بداية أتقدم لكم بجزيل الشكر والامتنان لمساهمتكم بجزء من وقتكم الثمين للإجابة على هذه الاستبانة، وأود هنا أن ألفت عناية حضراتكم إلى الملاحظات التالية

- تهدف هذه الاستبانة إلى دراسة العوامل المهمة التي تؤثر علي نجاح إدارة المقاولين من الباطن في المشاريع الإنشائية في قطاع غزة.
- الدراسة هي جزء من البحث التكميلي لنيل درجة الماجستير في إدارة التشييد في الجامعة الإسلامية بغزة.
- تقديرا لجهودكم بمشاركتكم في تعبئة هذه الاستبانة فإن الباحث سيطلعكم على نتائج الدراسة للاستفادة منها قدر الإمكان من أجل خدمة قطاع صناعة التشييد في فلسطين.
- المعلومات التي ستساهمون بها هي لغرض البحث العلمي، وسيتم الالتزام التام بالمحافظة على سرية المعلومات الخاصة بكم.
- يرجو الباحث أن تكون المعلومات صحيحة ودقيقة للوصول إلى النتائج المرجوة من هذا البحث.
- مكونات الاستبيان:

1. السيرة الذاتية للشركة.
2. العوامل المؤثرة علي نجاح إدارة المقاول من الباطن.
3. تأثير إدارة المقاول من الباطن على توفير تكاليف المشروع والوقت اللازم لتنفيذه.
4. المعوقات والحواجز التي تؤثر على تحصيل الأداء جيد من فريق المقاول من الباطن.

شاكـــرا لكم حســـن تعاونكـــــم

م. محمد حسن فارس شحادة
جوال رقم : 0599668218

استبيان

يرجى وضع علامة (√) عند الإجابة المناسبة

القسم الأول / معلومات عامة.

<u>خاص بالمقاول الرئيسي</u>

1. فئة تصنيف الشركة : ☐ أولى ☐ ثانية ☐ ثالثة
2. عدد سنوات خبرة للشركة :

☐ أقل من 5 سنوات ☐ 5-10 سنوات ☐ 11-15 سنة ☐ أكثر من 15 سنة

3. مكان الشركة :

☐ شمال غزة ☐ غزة ☐ المنطقة الوسطى ☐ جنوب غزة

4. وظيفة معبئ الاستبيان في الشركة :

☐ مدير مشروع ☐ مهندس مكتب ☐ مهندس موقع ☐ مالك الشركة ☐ غير ذلك.....

5. خبرتك في مجال الإنشاءات:

☐ أقل من 5 سنوات ☐ 5-10 سنوات ☐ 11-15 سنة ☐ أكثر من 15 سنة

6. عدد الموظفين الثابتين المختصين في مجال الإدارة في الشركة

☐ أقل من 5 ☐ 5-10 ☐ 11-15 ☐ أكثر من 15

7. عدد العاملين الثابتين في المؤسسة أو الشركة التي تعمل بها.

☐ أقل من 5 ☐ 5-10 ☐ 11-15 ☐ أكثر من 15

<u>خاص بالمقاول من الباطن</u>

1. تخصص المقاول من الباطن

☐ طوبار ☐ بناء ☐ قصارة ☐ بلاط

☐ دهان ☐ ميكانيك ☐ كهرباء ☐ غير ذلك .....

8. مكان المقاول من الباطن :

☐ شمال غزة ☐ غزة ☐ المنطقة الوسطى ☐ جنوب غزة

9. عدد سنوات الخبرة للمقاول من الباطن :

☐ أقل من 5 سنوات ☐ 5-10 سنوات ☐ 11-15 سنة ☐ أكثر من 15 سنة

2. طاقم المقاول من الباطن (عدد العمال)

☐ أقل من 5 ☐ 5-10 ☐ 11-15 ☐ أكثر من 15

الجزء الثاني : العوامل المهمة المؤثرة علي نجاح إدارة المقاول من الباطن في قطاع الإنشاءات

وضح رأيك حول درجة تأثير هذه العوامل علي مدي نجاح إدارة المقاول الباطن (اختر الإجابة الأكثر دقة

رقم مسلسل	عوامل النجاح المؤثرة علي ادارة المقاول من الباطن في المشروع الانشائي	مهم بدرجة قليلة جدا	مهم بدرجة قليلة	مهم بدرجة متوسطة	مهم بدرجة كبيرة	مهم بدرجة كبيرة جدا
1	**عوامل لها علاقة بالظروف المتعلقة بالمشروع**					
1.1	وجود المشروع في مكان مكتظ بالسكان					
1.2	الجدولة الزمنية لمراحل تنفيذ المشروع غير مدروسة ويصعب تنفيذها					
1.3	المشروع ضخم ومعقد					
1.4	زيادة الأعمال الإضافية للمشروع عن الحد المقرر في العقد					
1.5	المشروع في مكان منعزل ويصعب الوصول اليه					
1.6	عدم وجود ميزانية احتياطية للأعمال الإضافية للمشروع					
1.7	التغييرات جذرية في طبيعة أعمال المشروع					
1.8	وجود العديد من معوقات التنفيذ					
1.9	سياسة الحكومة، وحالة السوق والأوضاع السياسية					
2	**عوامل لها علاقة بوثائق العقد وادارة عقد التشييد**					
2.1	تطبيق نظام أقل الأسعار لترسيه العطاء					
2.2	تطبيق نظام أقل الأسعار لاختيار المقاول من الباطن دون مراعاة أي معايير اخرى					
2.3	مساعدة المقاول الباطن للمقاول الرئيسي أثناء تسعير المناقصات					
2.4	من المفضل ان يكون المقاول من الباطن شركة رسمية مسجلة لدي الدوائر الرسمية مثل اتحاد المقاولين					
2.5	الفهم الصحيح من قبل المقاول الرئيسي والمقاول من الباطن لوثائق المشروع واهدافه وسبل تنفيذه					
2.6	وضوح العقد المبرم بين المقاول الرئيسي والمقاول من الباطن					
2.7	التأخير في اعتماد أوامر التغيير					
2.8	الامتثال الي اللوائح والقوانين من قبل المقاول الرئيسي والمقاول من الباطن					
2.9	التزام المقاول من الباطن بالعقد المبرم بينه وبين المقاول الرئيسي					
2.10	جودة ووضوح المخططات التصميمية والمخططات التنفيذية					
2.11	طريقة الدفع للمقاولين الرئيسيين من المالك (Payment Method)					
2.12	التأمين وأسعار الفائدة والسندات / شروط القروض					
2.13	مدى تطبيق نظام الجودة في المشروع					
3	**عوامل لها علاقة بطاقم المشروع بشكل عام**					
3.1	ضعف كفاءة ومؤهلات ومهارات الطاقم التنفيذي للأعمال					
3.2	دعم طاقم المشروع معنويا					
3.3	اعداد دورات تدريبية تؤهل طاقم المشروع للعمل في الموقع					
3.4	عدد الحرفيين والعمال الموجودين في طاقم المشروع					
3.5	مؤهلات وخبرة طاقم الإشراف الموجود في الموقع					
3.6	التعاون بين طاقم المشروع					

رقم مسلسل	عوامل النجاح المؤثرة علي ادارة المقاول من الباطن في المشروع الانشائي	مهم بدرجة قليلة جدا	مهم بدرجة قليلة	مهم بدرجة متوسطة	مهم بدرجة كبيرة	مهم بدرجة كبيرة جدا
4	**عوامل لها علاقة أو تخص المدير الفني للمشروع**					
4.1	شخصية وخبرة مدير المشروع					
4.2	الراتب المخصص لمدير المشروع ومدى رضاه					
4.3	المستوى الإداري للقيادة					
4.4	التواصل والتنسيق المنتظم والفعال مع المقاول الرئيسي والمقاولين من الباطن					
4.5	القدرة علي ادراك مدير المشروع لطبيعة الاعمال الأخرى المرتبطة بأعمال المقاول من الباطن					
4.6	التنسيق الجيد بين جميع المقاولين من الباطن في المشروع الواحد					
4.7	القدرة علي التحمل والتحكم بحجم المشروع من قبل مدير المشروع					
4.8	مراقبة اعمال المقاول من الباطن للتأكد من اتباع خطة العمل وطريقة العمل في التنفيذ					
4.9	يجب علي مدير المشروع أخذ موافقة خطية من الإشراف لأي نشاط قبل تنفيذه لتفادي الأخطاء التنفيذية					
5	**عوامل لها علاقة بالمقاول الرئيسي للمشروع**					
5.1	تاريخ وخبرة المقاول الرئيسي السابقة اضافة الي سمعته					
5.2	القدرة العملية والتقنية للمقاول الرئيسي					
5.3	أداء المقاول في المشاريع السابقة المشابهة					
5.4	قوة وقدرة المقاول الرئيسي المالية					
5.5	القدرة علي التعامل مع حالات عدم اليقين في المشاريع الإنشائية					
5.6	متابعة ومراقبة طاقم المقاول الرئيسي لأعمال المقاول من الباطن					
5.7	مساعدة المقاول الباطن ماليا للقدرة علي شراء التوريدات بالوقت المطلوب والكمية المطلوبة					
5.8	ضرورة امداد المقاول من الباطن من قبل المقاول الرئيسي بخطة العمل للمشروع قبل البدء بالتنفيذ					
5.9	توفير المقاول الرئيسي خدمات الموقع ومتطلبات العمل بالشكل المطلوب للمقاول من الباطن					
5.10	التأكد من تناسب سعر المقاول من الباطن لمتطلبات الجودة ولمواصفات العقد.					
5.11	التزام المقاول الرئيسي بالجدول الزمني الخاص بالمشروع					
5.12	القدرة في تحمل المخاطر في حالة تأخير السداد من قبل المالك					
5.13	القدرة علي تحمل المسؤولية في حالات وقوع الحوادث					
5.14	طبيعة العلاقة بين المقاول الرئيسي وبين المقاول الفرعي والمالك وطاقم الاشراف					
5.15	انعدام الثقة بين المقاولين الرئيسيين والمقاولين من الباطن					
6	**عوامل لها علاقة بالمقاولين من الباطن في المشروع**					
6.1	حجم طاقم المقاول من الباطن					
6.2	تاريخ وخبرة المقاول من الباطن السابقة اضافة الي سمعته					
6.3	القدرة العملية والتقنية لمقاول من الباطن					
6.4	قوة وقدرة المقاول من الباطن المالية					
6.5	أداء المقاول من الباطن في المشاريع السابقة المشابهة					
6.6	إلمام المقاول من الباطن بطبيعة الفحوصات المطلوبة للأعمال الخاصة به والمواد الموردة من قبله					
6.7	مدى التزام المقاول من الباطن للمواصفات والجودة الخاصة بالمشروع					
6.8	مدى التزام المقاول من الباطن بالجدول الزمني الخاص بالمشروع					
6.9	تطبيق نظام الرقابة الدقيقة على التكلفة من طرف المقاول من الباطن					
6.10	الدفع الفوري للعمال من قبل المقاول من الباطن					
6.11	توفير المعلومات الدقيقة والشروط الخاصة للمقاول الرئيسي من قبل المقاول من الباطن					

الجزء الثالث : تأثير إدارة المقاول من الباطن علي توفير تكاليف المشروع والوقت اللازم لتنفيذه.
وضح رأيك حول درجة تأثير إدارة المقاول من الباطن علي العوامل التالية الخاصة بتوفير الوقت والتكلفة للمشروع
(اختر الإجابة الأكثر دقة)

رقم مسلسل	**تأثير إدارة المقاول من الباطن على توفير تكاليف المشروع والوقت اللازم لتنفيذه.**	مهم بدرجة قليلة جدا	مهم بدرجة قليلة	مهم بدرجة متوسطة	مهم بدرجة كبيرة	مهم بدرجة كبيرة جدا
1	زيادة نسبة الأرباح في المشروع					
2	تقليل تكلفة المواد والمعدات الخاصة بالمشروع					
3	تقليل تكلفة العمالة الموجودة في المشروع					
4	تقليل نسبة الفاقد من المواد الناتجة من الاعمال الإنشائية المختلفة					
5	تقليل تكلفة إعادة تنفيذ بعض الأعمال					
6	ضبط أو تقليل المدة المقترحة لإنهاء المشروع					
7	تقليل المدة اللازمة لتنفيذ الأوامر التغيرية					
8	تقليل المدة اللازمة لإصلاح أو تعديل الأخطاء والعيوب					
9	تقليل المصاريف الإدارية للمشروع					

الجزء الرابع: المعوقات والحواجز التي تؤثر تحصيل أداء جيد من فريق المقاول من الباطن.
وضح رأيك حول درجة تأثير العوامل التالية على مدى الحصول علي أداء جيد من طاقم المقاول من الباطن
(اختر الإجابة الأكثر دقة)

رقم مسلسل	**المعوقات والحواجز التي تؤثر تحصيل أداء جيد من فريق المقاول من الباطن.**	مهم بدرجة قليلة جدا	مهم بدرجة قليلة	مهم بدرجة متوسطة	مهم بدرجة كبيرة	مهم بدرجة كبيرة جدا
1	تناسب المدة المخصصة مع العمل المراد تنفيذه من قبل طاقم المقاول من الباطن لتجنب الاستعجال في التنفيذ					
2	ضعف تقنيات قطاع الإنشاءات					
3	عدم رضا عمال المقاول من الباطن عن الرواتب أو الأجور المخصصة لهم					
4	ضعف سعر العقد المبرم الخاص بالمقاول من الباطن مع المقاول الرئيسي ونسبة الربح في المشروع					
5	ضعف التعاون بين جميع عناصر المشروع وبين طاقم المقاول من الباطن					
6	قلة خبرة طاقم الإشراف الموجود في الموقع					
7	امتثال طاقم المقاول من الباطن للقوانين العامة والقوانين المنصوص عليها في العقد					
8	ضعف التواصل بين المقاول الرئيسي والمقاولين من الباطن					
9	ضعف نهج الأمن والسلامة المتبع في الموقع					
10	عدم تسهيل وصول المقاول من الباطن الى منطقة عمله داخل الموقع					
11	عدم امتلاك المقاول من الباطن جميع المعدات اللازمة والمطلوبة لإنجاز الأعمال					
12	ضعف التآلف بين العمل وموقع العمل					
13	نظافة بيئة العمل					
14	عوامل الأمن والسلامة المتخذة في الموقع					
15	عدم القدرة على التحكم بالوقت الخاص بتنفيذ الأعمال من قبل المقاول من الباطن					