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عمـادة الدراسـات الـعـــليا

CAUSES OF CONTRACTOR'S FAILURE IN GAZA STRIP

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بِسْمِ اللهِ الرَّحْمنِ الرَّحِيمِ

أَفَمَنْ أَسَّسَ بُنْيَانَهُ عَلَى تَقْوَى مِنَ اللَّهِ وَرِضْوَانٍ خَيْرٌ أَمْ مَنْ أَسَّسَ بُنْيَانَهُ عَلَى شَفَا جُرُفٍ هَارٍ فَانْهَارَ بِهِ فِي نَارِ جَهَنَّمَ وَاللَّهُ لَا يَهْدِي الْقَوْمَ الظَّالِمِينَ

صَدَقَ اللهُ الْعَظِيمُ

(109) سورة التوبة

Dedication

To whom I belong to …

Acknowledgment

- ❖ I would like to express my deepest appreciation to my supervisor Professor Adnan Enshassi for his valuable advices, continuous encouragement and professional support and guidance.

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Abstract

Failure, collapse, bankruptcy, and best are common words in the construction industry since construction industry involves many risks.

This research is conducted to determine the causes of construction business failure and to investigate the severity of these causes from the contractor's point of view.

The objectives of this research have been achieved by means of interviewed questionnaire. The questionnaire included fifty three questions distributed to seventy-five contracting companies. Sixty-five questionnaires from which received and analyzed to determine the severity of each factor affecting contractor's failure. The gathered data include the sample characteristics of the study population and the five main groups; managerial, financed, expansion, environment, and political.

The results of analyzing 53 causes of failure showed that the main cause of contractors failure are: delay in collecting dibs from clients (donors), closure, depending on banks and paying high profits, lack of capital, cash flow management, lack of experience in the line of Gaza Strip, absence of construction regulations, low margins of profit due to competition, award contract to lowest price, and lack of experience in contracts.

The results of this study recommended that PNA must take the risk when Donors delay the dibs, modify and improve the construction regulations, connect price with index, introduce coherent polices towards groups suffered people injured by failure, conduct training programs to explain the external and internal factors affecting the construction industry, and award tenders to accurate estimate cost and not necessary to the lowest bidder. The study also recommended the contractors to avoid bank loans, react to political and environment changes, not to increase the number of projects and not to increase the volume of project, make sure that top management must not be of same knowledge and experience, and to calculate and consider political and environmental risks in costing and estimating contracts.

ملخص البحث

يعتبر الفشل من الأمور التي تميز صناعة الإنشاءات لما يميز هذه الصناعة بوجود العديد من المخاطر.

إن الهدف الرئيسي من هذا البحث هو تحديد أسباب شركات المقاولات في قطاع غزة، وتحديد درجة تأثير كل سبب من وجهة نظر المقاولين.

لقد استخدم هذا البحث أسلوب الاستبانة المصحوبة بالمقابلة الشخصية لتحقيق الأهداف، حيث تم توزيع خمس وسبعين استبانة علي شركات المقاولات في قطاع غزة، حيث تمت إعادة خمس وستين استبانة.

وقد احتوت الاستبانة علي ثلاثة وخمسين سبباً تم تقسيمها إلى مجموعات رئيسية وهي مجموعة الأسباب الإدارية، المالية، التوسيعية، البيئية، والسياسية.

وقد أوضحت النتائج أن أهم الأسباب التي تسبب فشل المقاولين هي: استرداد المبالغ بسرعة وفاعلية، الإغلاق، الاعتماد علي البنوك ودفع فوائد عالية، رأس المال غير كافي، إدارة السيولة النقدية، نقص الخبرة في مجال العمل، تقسيم القطاع إلي مناطق، غياب القوانين والنظم لصناعة المقاولات، قلة الأرباح بسبب المنافسة، ترسية العطاءات علي أقل الأسعار، قلة الخبرة في مجال العقود.

وقد أوصت الدراسة السلطة الوطنية بأن تتحمل المسؤولية عندما تتأخر الدول المانحة في دفع مستحقات المقاولين، وأن تقوم بتعديل النظم والقوانين التي تحكم صناعة المقاولات بما يضمن تقليل التأثير السلبي للإغلاق، وكذلك ربط الأسعار بجدول غلاء المعيشة، كما أوصت الدراسة السلطة بعمل دورات تدريبية للمقاولين بالتعاون مع اتحاد المقاولين والجامعة الإسلامية لتطوير النواحي الإدارية والمالية للمقاولين مما يساعد المقاولين على التعرف على العوامل الخارجية التي تؤثر على صناعة المقاولات، إلى جانب عدم ترسية العطاءات على أقل الأسعار وترسيتها على السعر الأنسب.

كما أوصت الدراسة المقاولين بتجنب قروض البنوك، كما أوصت إدارة الشركات بوضع سياسات إدارية ومالية تتوافق مع المتغيرات السياسية والبيئية، وأوصت المقاولين كذلك بعدم زيادة عدد وحجم المشاريع لدرجة لا يمكن السيطرة الإدارية والمالية عليها.

كما أوصت الدراسة المقاولين بأن تكون إدارتها العليا متنوعة المعرفة والخبرة، وأوصت كذلك بحساب واعتبار الأخطار السياسية والبيئية في عملية تسعير العطاءات.

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List of Acronyms

CPRS	Center for Palestine Research and Studies
GDP	Gross Domestic Product
GFCF	Gross Fixed Capital Formation
GNP	Gross National Product
PCU	Palestinian Contractors' Union
PCBS	Palestinian Central Bureau of Statistics
WBGS	West Bank and Gaza Strip
USA	United States of America
UNDP	United Nations Development
UNRWA	United Nations Relief and Works Agency
PECDAR	Palestinian Economic Council for Development and Reconstruction
SPSS	Statistical Package for social Science
WB	West Bank
GS	Gaza Strip
PASSIA	Palestine Academic Society for the Study of International Affairs
PNA	Palestine National Authority
MAS	Palestinian Economic Policy Research
MOPIC	Ministry of Planning and International Co-operation

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Chapter 1

Introduction

This research is to try to define what is that causes perfectly healthy companies to collapse or fail. Understanding this mechanism can perhaps prevent their failure or alleviating it or may be even reversing it.

In this chapter an introduction to the construction industry and the Palestinian economy will be highlighted. Also, the research importance, problem, objectives, and boundaries are to be explained.

1.1 Background

Collapsed, failed, bankrupt, broke, and bust. None of these are pleasant words, and this is not a very pleasant subject, but in real life companies do collapse, they do fail, do 'go bust' (Argenti, 1976).

The prospect of construction business failure is an important topic to explore. Since construction industry has a very high risks, failure is a real possibility. In the overall picture the construction industry is at or near the top in the annual rate of business failures and resulting liabilities (Clough, 1994). The construction business failures become very high due to the characteristics of the construction industry. The construction industry is fragmented, very sensitive to economic cycles, and highly competitive because of the large number of firms and relative easy of entry (Kangari, 1988). Also, the adversely relationship between the three parties of project (owner, consultant, and contractor) is one of the important factor that increase the possibility of failure. The contractor is at for more risk than his counterpart in almost any other industry (Kangari, 1987). In general, the study of construction business failure has not been given much attention. This is particularly true in Gaza strip. The increasing number of failures in construction firms makes the understanding of such subject vital (critical). This research will be focused to explore the factors that lead to contractor's

failure and identify the severity of each factor. This could help to prevent or reverse a firm's collapse.

1.2 The Construction Industry

The construction industry was the largest business segment in the U.S. economy, representing about 10 percent of gross national product (GNP) (Ritz, 1994). Construction industry includes all immobile structures, such as buildings, tunnels, pipelines, dams, canals, airports, power plants, railroads, docks, bridges, sewage treatment plants, and factories (Hinze, 2001). Construction is becoming increasingly challenging with modern-day clients intricate requirements for complex construction, high quality products and shorter completion times (Otowda, 1989).

1.3 The nature of the construction industry

The nature of the construction projects makes the industry unique in that the manufacturing facility or plant must move to the construction site (Hinze, 2001). There are many different descriptions of the construction industry, drawn from different specialist disciplines. This vagueness is compounded by the fact that the construction involves such a wide range of activity that the industry's external boundaries are also unclear (Murdoch and Hughes, 2000). For example, the term "construction" can include the erection, repair, and demolition of things and diverse as houses, offices, shapes, dams …etc. Construction is difficult to comprehend fully because the relationships between the parts are not always clear and the boundaries of the industry may be characterized as:

- It is fragmented

- It is sensitive to economic cycles

- There are extraordinary diversity of professions, specialists and suppliers

- It is largely affected by external environments

There is no other industry that requires the proper application of business practices much as construction industry. The many variables and complex relationships that exist between variables that must be considered in the process of building a construction

project necessitates sound business practices and decisions. The coordination and use of many types of labor skills, materials and equipment that are used to build a project require daily application of proper business practices (Adrian, 1975). The variable environment surrounding the construction project complicated decisions to be made concerning the use of labor, materials and equipment. In addition, governmental influence and labor practices have a bearing on business decisions that must be made (Adrian, 1975).

1.4 Management in Construction

On the whole, construction contractors have been slow in applying proper management methods to the conduct of their business (Clough and Sears, 1994). Management in construction industry have been characterized as being weak, insufficient, nebulous, backward and slow to react to changing conditions. Nevertheless, in the overall picture the construction industry is at or near the top in the annual rate of business failures and resulting liabilities (Clough and Sears, 1994). Explanations are given for why the construction has been slow in applying management procedures that have proven effective in other industries. The reasons are:

- Construction projects are unique
- Construction projects involve many skills largely non-repetitive in nature
- Projects are constructed under local conditions of weather, location, transportation and labor that are more or less beyond the contractor's control.
- Construction firms, in main, are small operations, with the management decisions being made by one or two persons (Clough and Sears, 1994)
- There are special problems in construction
- The future can not be forecasted
- Construction is a high-risk business (Raftery, 1997)

1.5 Risks in Construction

The construction industry generally has a bad reputation for its work. The industry has a reputation for time and cost overruns (Raftery, 1997). This bad reputation is due to many reasons. One of them is that the construction industry is one of riskiest of all business types (Clough and Sears, 1994). There are many types of risk in the construction contracts; they are:

- Physical works

- Delay and disputes

- Direction and supervision

- Damage and injury to persons and property

- External factors

- Payment

- Law and arbitration

1.6 The Size of the Construction Industry

The construction industry represents the largest single activity in the American economy. It accounts for over $80 billion in expenditures per year in new construction alone and constitutes 7 to 11 percent of the gross domestic product (GDP) (Hinze, 2001). Approximately 5 to 6 million workers of the industrial workforce in U.S.A. are employed directly in the construction industry. These numbers do not include nearly 1,300,000 establishments with no payroll or the more than 1 million non-construction employees required to keep the industry viable. Furthermore, 15 percent of the industrial workforce is directly or indirectly involve in the construction (Hinze, 2001).

1.7 The Construction Economy

The construction industry is large in size and significant in the role it plays in the economy (Hinze, 2001). Construction industry fortunes tend to fluctuate with the general economy (Olomolaiye, Jayawardane and Charrie, 1998). Construction has a cyclical nature and quick response to changes in the economy. For that reason, entry in the industry must be facilitated. In fact, more than one in every eight business starts

occurs in construction (Hinze, 2001). The easy entry is made possible and necessary for the following reasons:

- High growth rate in the construction industry

- Low capital requirements

- Little absolute cost or profit advantages for established firms

- No rigid licensing requirements or fees

- Firms are seldom sold as a unit (continuity is not assured or guaranteed)

- A company can be formed just to construct a single project (Hinze, 2001).

1.8 Construction Categories

There are four categories in the USA. They are housing construction, non-residual building construction, engineering construction and industrial construction. In Gaza Strip and The West Bank, there are five broad categories. These categories are listed below:

- Building construction

- Roads

- Water and drainage

- Electromechanical

- Maintenance and general works. (PCU, 1994)

The distribution of Gaza Strip contractors among the major three fields of work in the construction industry is illustrated in Table 1.1. In Roads field 14.2% of the roads companies are classified in first class (A&B). 22% are registered in first class in water and sewage fields. Out of 132 companies of valid registration in 2001, 34%, 9.8%, and 11.36 are classified in the class in the fields of buildings, roads, water sewage respectively (Sawalhi, 2002).

Table 1.1 Distribution of contracting companies among different fields of construction works (Contractors Union, 2001)

Field	First		Second	Third	Fourth	Fifth	Total
	A	**B**					
Buildings	19	26	41	13	7	15	**121**
Roads	6	7	13	26	16	23	**91**
Water and Drainage	15		18	11	18	6	**68**

1.9 The Contractor's Organization

The Palestinian Contractors' Union (PCU) was established in 1994. It performs a number of valuable services for its members such as classification procedures, follow-up and solving problems, increase industry cultures and habits, support inter-social relationships between members …etc.

1.10 Failures in Construction

Throughout recent years the construction industry has witnessed an increasing number of construction financial failures (Adrian, 1997). The construction contracting business has the second highest failure rate of any business, exceeded only by restaurants (Clough and Sears, 2000). Although many of the firms that fail are small in regard to their owned assets, there is evidence of business failures among large firms (Adrian, 1997). For the past several years, construction contractors have accounted for a disproportionate number of business failures in the U.S.A. For example, during 1994 in which construction accounted for 8 percent of the gross national product, contractors accounted for approximately 22 percent of all financial failures and 18 percent of the resulting liabilities. Business failures in the construction industry can be traced by many causes. Some of these are related to excessive competition, unexpected bad weather, national slumps in the economy, and simply bad judgment. In addition, a large number

of contractors' business failures can be traced to discuss of proven business (Adrian, 1975).

The causes of construction business failure will be discussed in detail in chapter '3'.

In the Gaza Strip, there is evidence that the number of contractor's failure is increasing rapidly.

1.11 The Palestinian Economy

Palestinian economy is almost totally dependent on the economy of Israeli occupation. This situation was created to serve the interests of the occupying power (PECDAR, 2001). More than 80 percent of exports are directed to Israel, from which 90 percent of imports originate. Palestine experiences a trade deficit with Israel because after thirty years of neglect, it lacks a broad, competitive industrial and agricultural base. This situation is further compound by Israeli restrictions on the volume, destination and sources of Palestinian trade (PECDAR, 2001).

During the past two decades, more than three quarters of private investment were in construction (PECDAR, 2001). The construction share in GDP for WBGS had reached unprecedented levels. This is illustrated in Table 1.2. The distribution of GDP among different sectors during the year of 1994 is illustrated in Figure 1.1 (PECDAR, 1997). This distribution had fluctuated during time. For example, 1in 1998, the contribution of construction share to the GDP has been reduced to 10.63% (PCBS, 2000).

Table 1.2 Construction share in GDP for WBGS (PECDAR, 2001)

Item/Years	G.D.P	Construction Share %
1972	276.2	9
1974	548.7	12
1976	650.5	16
1978	695.4	16
1980	1044	16
1982	1002	19
1984	998.8	18
1986	1536.7	16
1988	1789.9	16.7
1990	2220	21.6
1992	2486.6	22.4
1994	2975.23	26

Data released from the Palestinian Central Bureau of Statistics (PCBS) provides the first concrete evidence of the performance of the West Bank and Gaza Strip (WBGS) economy in the period following the Oslo Accords. According to this data, the real Gross Domestic Product (GDP) per capita for the WBGS (excluding east Jerusalem) decline by 5.4% in 1966 and Gross Fixed Capital Formation (GFCF) decreased by 6.0%. The center for Palestine Research and Studies (CPRS) conducted an opinion poll in November 1997 in which 47.4% of respondents said that they were worse off financially than they had been before the peace process and only 13.6% indicated that they were better off. The main economic indicators in the Gaza Strip are listed in Table 1.3.

Figure 1.1 The distribution of GDP among different sectors during the year 1994 (PECDAR, 1997)
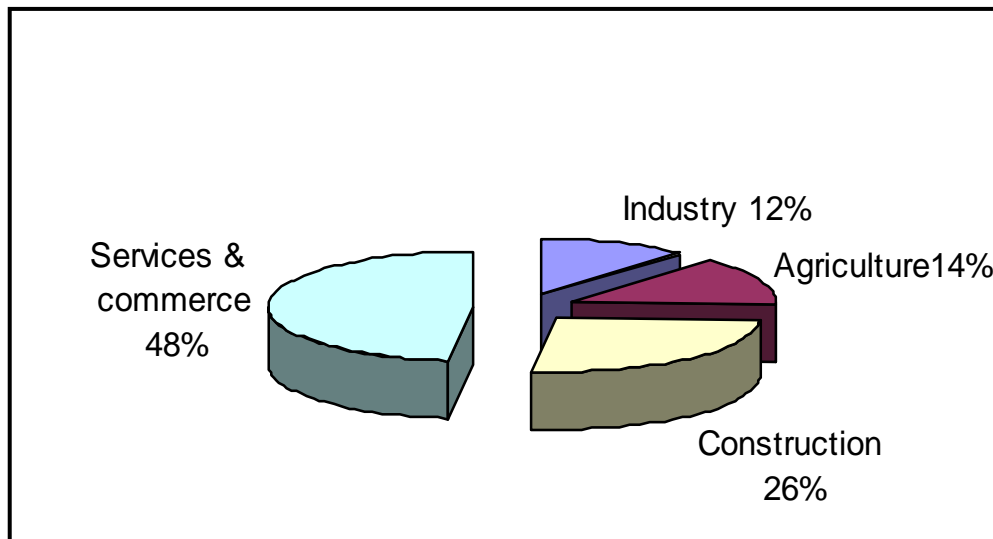
Figure 1.2 illustrates the distribution of labor force employed in construction industry from the year 1997 to 2001 (PASSIA, 2002).

Figure 1.2 Labor forces employed in construction sector (PASSIA, 2002)
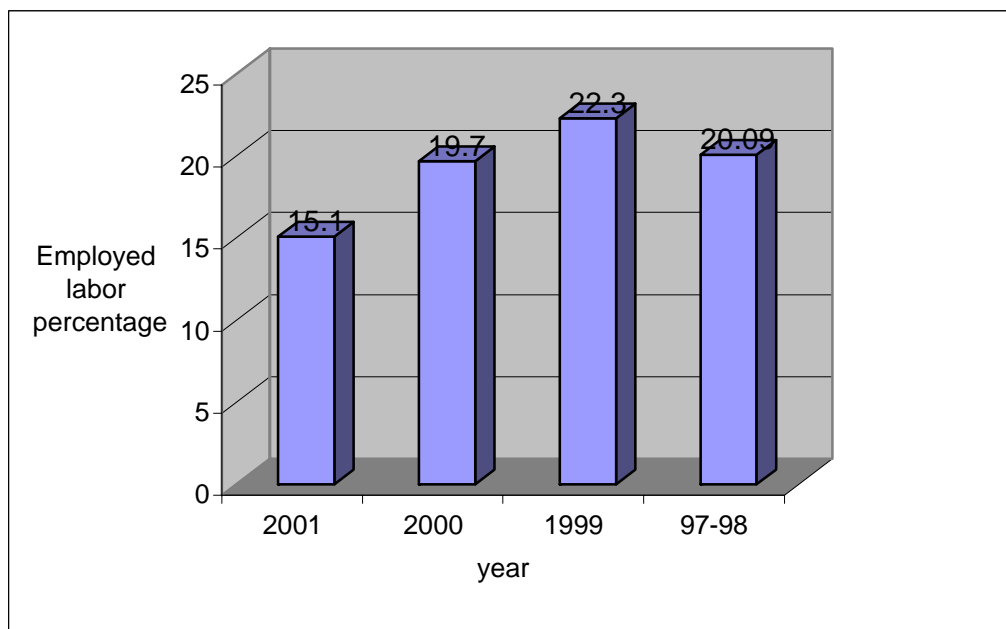
Table 1.3 Main Economic indicator ˙ ̃ ̃trip (MAS, 1999).

Indicator	Year	Value
Population	Mid- 1997	995,522
Population	Mid- 1998	1,093,580
Growth rate	1998	4.40
Labor force (thousands)	Fourth quarter1998	204.63
Employment (thousands)	Fourth quarter1998	161.452
Employment in domestic economy (thousands)	Fourth quarter1998	137.782
Employment in Israel (thousands)	Fourth quarter1998	23.670
Public employment (%)	Fourth quarter1998	25.80
Labor force participation rate (%)	Fourth quarter1998	37.4
Female labor force participation rate (%)	Fourth quarter1998	6.3
Male labor force participation rate (%)	Fourth quarter1998	66.0
Average unemployment (%)	Fourth quarter1998	21.1
GDP (million US$, current prices)	1997	1,256.3
GNI (million US$, current prices)	1997	1,382.0
Per-capita GDP (US$)	1997	1,388
Final consumption from GDP (%)	1997	123.5
Government final consumption from GDP (%)	1997	27.3
Household final consumption from GDP (%)	1997	90.4
Head count index (poverty/population) (%)	Fourth quarter1998	37.3
Total bank deposits (millions US$)	End of Dec. 1998	602.21

However, economic indicators show that the actual deterioration in standards of living has been far more dramatic in the West Bank, with a 19.7 percent loss of per capital GDP compared with 8.4 percent in the Gaza Strip two years after the Oslo agreement. The construction sector, in contrast, enjoyed a steady increase from 1991, due to "pent-up demand from the Intifada, and to accommodate Palestinian returnees from the Gulf after the Gulf War. The peace process accelerates this increase, especially after the return of the many Palestinians who came with the PNA," and by the fall of 1996 the construction sector was employing 12.6 percent of employed Palestinian workers (MAS, 1997). Other contribution of the work force in construction relevant to other sectors is illustrated in Table 1.4 (PASSIA, 2002).

Table 1.4 Palestinian labor force by economic activity (%) (PASSIA, 2002)

Sector	1997-98	1999	2000	2001		
	Average	Average	Average	WB	GS	Total
Agriculture forestry, hunting, fishing	12.85	12.7	13.7	12.8	9.4	11.4
Mining, manufacturing quarrying,	16.17	15.5	14.3	14.6	8.8	13.3
Construction	20.09	22.3	19.7	11.2	6.1	15.1
Commerce, hotels, restaurants	18.77	16.8	17.5	20.4	17.6	19.0
Transportation, storage, communication	4.7	4.6	4.9	7.2	4.5	5.8
Services and other branded	27.35	28.05	29.9	33.8	53.6	35.4

1.12 Problem background

For a long time the study of construction business failure has not been given much attention like the study of construction business success. In Gaza Strip, contractor's failure becomes a phenomenon and no attention is given to such subject.

The valid registration of the Gaza Strip contracting companies (Table 1.5) varied during the period from 1995 to 2000. Table 1.5 shows that the number of new registered companies during the period 1995-2000 is 123 companies while the number of failed companies is 121 companies. From the figures, the yearly average number of new registration of the contractor's list is 17.6 companies while the average of withdrawn companies is 17.3 companies. The implication that there is a balance between the newly registered companies in the Contractors Union and the average number of failed contractors keeps approximately constant average number of eligible companies.

Table 1.5 Contractors registration according to PCU (PCU, 2001)

Year	Valid Registration	Newly Registered	Withdrawn from list (failure)
1995	109	20	9
1996	155	26	10
1997	159	21	17
1998	161	13	12
1999	153	8	17
2000	138	13	28
2001	132	22	28

The increasing number of contractor's failure makes the understanding of this issue, not only important but also critical.

In this study, the factors affecting construction project failure to be determined, then analysis of these factors to be examined by the contractors in the Gaza Strip to determine the critical factors.

1.13 Objectives of study
The main objectives of this study are as follows:

1. To define the critical factors that lead to contractor's failure. Then a comprehensive analysis of these factors to be done.

2. Apply these factors to the different grades of contractors in Gaza Strip to identify the most sever factors causing the contractor failure in Gaza Strip.

3. Verify if all contractors share the same point of view about the severity of causes of failure.

4. Verify if different types of specializations also agree with the severity of failure causes.

5. To write a conclusion and recommendation that may minimize the contractor's failure.

1.14 Limitation of the Study

This study is limited to contractors of Gaza Strip who have valid registration in the contractor's union and qualified by the national (clarification) classification committee as of (due to) April 2002. All other organizations that have its own classification for contractors such as UNRWA, UNDP will be excluded. Also, contractors of first, second, and third class represent the population in this research, while contractors of fourth and fifth category will be excluded. This study is limited to construction phase only.

Chapter 2

Causes of failure

The definition, causes and symptoms, models, types of failure are to be explained in this chapter. Also cure and prevention of types of failure is to be illustrated.

2.1 definition of failure

There are many definitions of failure. According to Dun and Bradstreat's annual Business Failure Records (1986), which provide historical data on business activities in USA, a business failure is defined as a business that:

1. Ceases operation followings assignment or bankruptcy.
2. Ceases operation with losses to creditors after such actions as foreclosure or attachment.
3. Voluntarily withdraws, leaving unpaid debts; and,
4. Are involved in court actions such as receivership, reorganization of arrangement or voluntarily comprising with creditors.
5. Voluntarily compromised creditors.

According to Frederikslust (1978), failure is the inability of a firm to pay its obligations when they are due. It mostly appears in a critical situation as a consequences of a sharp decline in sales, as a result of recession, the loss of an important customer, shortage of raw materials, deficiencies of management etc.

Altman (1993) defined failure from the point of view of economics criteria. A company is considered to have failed if the realized rate of return on invested capital, with allowances for risk considerations, is significantly and continually lower than prevailing rates on similar investments. Another criterion is insufficient revenues to cover costs and situations where the average return on investment is below the firms cost of capital.

Baden-Fuller (1989) defined failure as a function of future evenents:

Л=rC-C',

Where Л = present value of anticipated profit in the coming period,

C = residual value of the plant if scrapped now,

r = rate of interest,

C' = present value of anticipated capital gain in scrap value from deferring the closure.

Storey (1994) attached a pejorative connotation to the term failure, implying either that the business should never have been started in the first place, or that the person was not competent to do so, or that the business left behind significant unpaid debt.

Watson & Everett (1993) attributed business failure to for different situations: discontinuance for any reason; ceasing to trade and creditor loss; sale to prevent further losses; and failure to make a go of it.

2.2 Causes and symptoms of failure

The relative weight of ten major causes of business failures in U.S. identified in Figure 2.1 (Dun and Bradstreet, 1986). Clearly from the figure, the most significant failure cause is economic factors. Within the economic factors category, there are five subcategories:

1. Bad profits
2. High interest rates
3. Loss of market
4. No customer spending
5. No future

Of these subcategories, bad profit is significant. Bad profits account for 74.2% of the failures in the economic factors category. Since economic factors account for 59.8% of all failures, alternatively it can be said that bad profits account for slightly over half of

all failures. Important causes of business failure in the construction industry are identified as:

1. Bad profits

2. Management incompetence and lack of experience

3. Inadequate sales

4. Loss of market and economic decline

5. Difficulty collecting from customers. (Business failure record, 1977-1986; Quarterly business start 1978-1986).

Figure 2.1 Causes of business failures (Business failure record 1986)

Causes of business Failure (Business failure record 1986
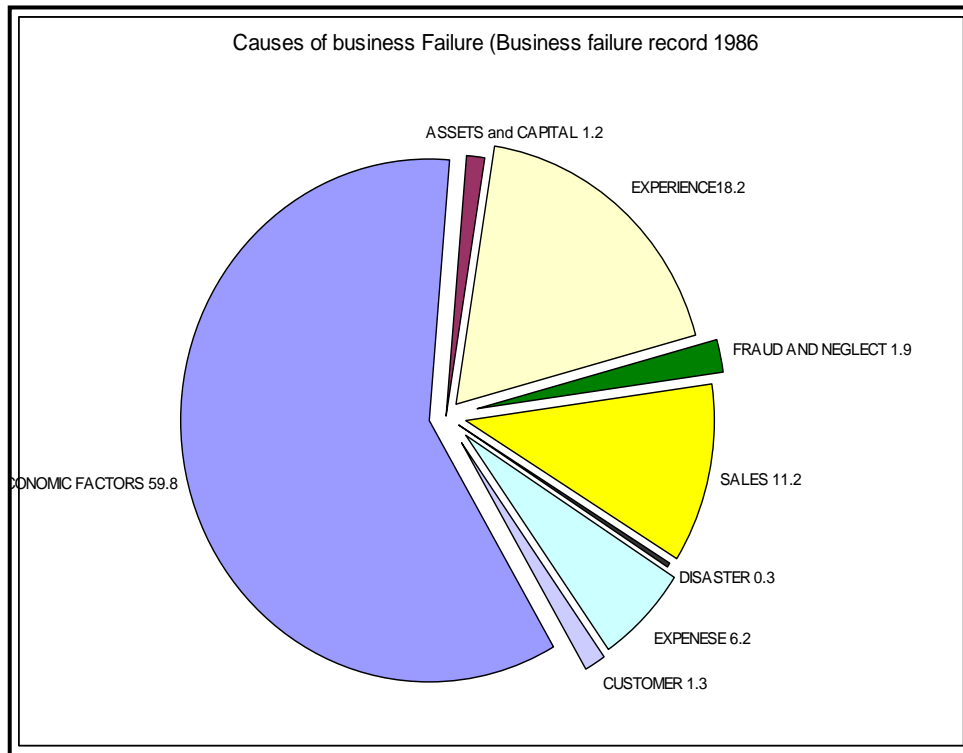
Dun and Bradstreet listed failure factors and the percentage average of occurrence in the construction industry in their yearly reports. The percentages of occurrence of these factors over the 5-year period 1989-1993 are presented in Table 2.1. From Table 2.1, over 80% of failures were caused by five factors, namely 'insufficient profit' (26.72), 'industry weakness' (22.73%), 'heavy operating expenses' (17.80%), 'insufficient capital' (8.29%) and 'burdensome insufficient debt' (5.93%).

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Table 2.1 Weighted average values of failure factors (Arditi, 2000)

Failure factors	Weighted % occurrence
Budgetary issues	
Insufficient profit	26.72
Heavy operating expenses	17.8
Insufficient capital	8.29
Burdensome institutional debt	5.93
Receivable difficulties	1.46
Human/ organizational capital issues	
Lack of business knowledge	3.89
Lack of managerial experience	0.91
Fraud	0.85
Lack of line experience	0.68
Lack of commitment	0.62
Poor working habit	0.59
Issues of adaptation to market conditions	
Inadequate sales	2.20
Not completive	0.29
Overexpansion	0.15
Business issues	
Business conflicts	2.43
Family problems	1.16
Macroeconomic issues	
Industry weakness	22.73
Poor growth prospects	0.28
High interest rate	0.06
Natural factors	
disasters	2.94
Total	**100.00**

Figure 2.2 shows the change in the number of construction-business failures over the period from 1977-1986 in U.S.A. The figure indicates that the number of construction business failure increasing. A more accurate indicator of the relative health of the construction industry and of failure tendency is the business failure rate as shown in Figure 2.3. The figure shows a comparison of the change in total number of failures and the change in failure rate over the 1978-1986 period. This figure uses an index of 1978=100 to equally compare the two items (Kangari, 1988).
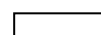
Figure 2.2 Construction business failures (Kangari, 1988)

Construction Failure Index

Construction Business Failure
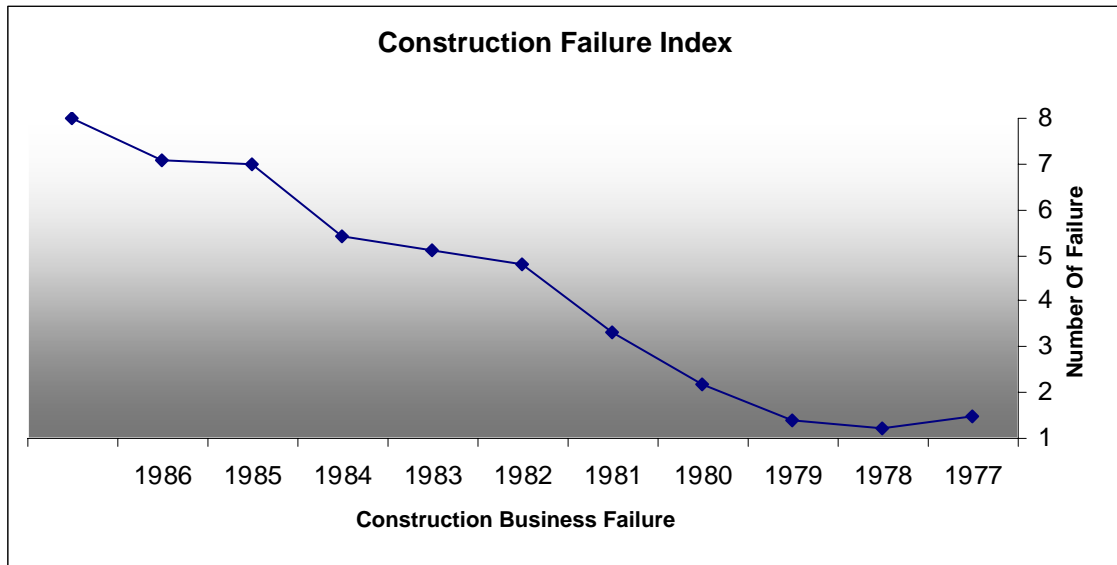
Figure 2.3 Failure index versus failure-rate index (Kangari, 1988)

Construction Failure Index

Failure index versus Failure -Rate Index
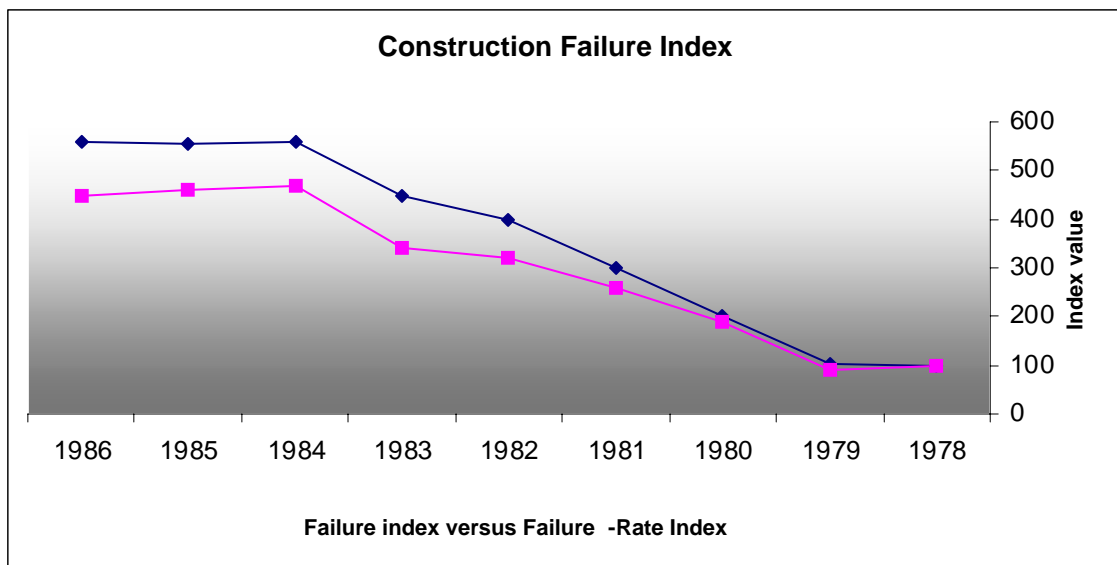
Kangari (1988) concluded that the analysis of business failure shows that the number of yearly failure in the construction industry have risen 484% from 1978-1986. A more accurate portrayal of the status of construction industry is through the use of failure rate. This statistics has risen from 22 per 10,000 to 107 per 10,000, or an increase of 386% from 1978 to 1986. This can be attributed to low construction activity and high interest rates. In years of 'between' 1983 to 1988, the average age of a construction company at

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failure has been declining and the most difficult time for a new company is the first three years. After that time the possibility of failure starts to drop.

Abidali and Harris (1995) listed common managerial characteristic of failed companies as follows:

1. Autocratic chief executive
2. The same person as both chief executive and chairman
3. The company board
4. Lack of engineering skills
5. Lack of a strong financial director
6. Defective managerial skills
7. Incomplete accountancy system
8. Defective bidding system
9. Poor marketing skills
10. Over-trading
11. Losses in projects

John Argenti (1976) in his book 'corporate collapse' summarized what was written in failure. He concluded six main causes as a result of what written about the subject of company failure follows:

1. Top management
2. Accounting information
3. Change
4. Accounting manipulation
5. Rapid expansion
6. Economic cycle

Ross and Kami (1973) in their book ' Corporate Management in Crisis' concluded that the most sever cause of failure is bad management, and in particular the breaking Ten Commandments listed below:

1. You must have a strategy and must communicate it.

2. You must have overall controls and cost controls.

3. The board must actively participate.

4. Avoid one-man rule.

5. Provide management depth.

6. Keep informed and react to change.

7. The customer is king.

8. Do not misuse computers.

9. Do not engage in accounting manipulations.

10. Provide an organization structure that meets people's needs.

Another list of symptoms was listed by Cohen (1973) under the title 'Confidence comes before a crash'. His list includes the following:

1. Liquidity problems must be investigated- they may be sings on approaching disaster.

2. It is surprising how easily credit can often be obtained.

3. Make sure that your customer mix is not drifting towards the … payers…

4. Keep abreast of technology.

5. Do not put prestige above profit.

6. Do not have too few customers.

7. You should ask why if your growth rate is not seven or eight per cent per annum.

8. Treat your employees as human beings.

9. Do not over expand.

10. Do not borrow too much or at too high interest rates.

Cohen also notes that managers seldom seem to realize that they are of the verge on collapse until it actually happens.

In an article called 'Causes of company failure' Hartigan (1973) listed seven main causes of failure. First, there is *lack of capital.* In the early years of a business the

proprietors often obtain assets on hire purchase, they seldom make allowances for early losses and so become highly dependent on the good will of creditors who do not always relish the role. Overtrading (rapid expansion in turnover not matched by an expansion of capital) is a frequent cause of failure especially where inadequate costing methods are used. Second, *under costing*; often there is no costing system at all and even where there is, such things as interested on loans or depreciation are forgotten. Third, *lack of control*; the proprietor prefers to be active himself rather than check up on other people's activities. Fourth, *lack of advice*; proprietors are reluctant to ask for advice from bankers, accountants, solicitors and so on. Fifth, the government; a great many bankrupts blame the government, but very often this is just an excuse-everyone knows that, without warning, tax rates change, laws are passed, credit is squeezed. Sixth, *trade fluctuations*; companies are often caught out by the business cycle, by mergers and by technological change. Finally, *fraud*; this cause is increasing.

John Argenti (1976) in his book 'corporate collapse' summarized the opinion of experts in failure. Kenneth Cork is the senior partner of one of the largest insolvency accountants in Britain. He had much experience in this field. One of the main causes of failure, he said, is simply bad communications; the boss dose not knows what is happening to the business as a whole in large companies especially; great waves of paper deluge the chief executive with thousands of the tiny disjointed facts.

Only occasionally does are came across a system that tells the chief executive in simple form what he want to know, which is how his business is doing as a whole. Another major cause is failure to keep up with a change in technology. Mr. Cork has a golden rule: never undertake a development the cost of which you cannot write off and still remain in existence.

Sir Ronald Leach had an opinion on one matter is definitive: if the management of a company is good then company will only fail as a result of bad luck. One aspect of good management is to avoid overtrading. Another aspect of good management is to calculate one's cash flow position for months or even year ahead. Another different opinion was

of Mr Paterson who identified several causes of failure. He identified several causes of failure as listed below:

1. Budgetary control
2. Banks
3. fraud

Argenti (1976) summarized the results of what the writers said and his interviews with experts are listed:

1. Management

   There is wide or even universal agreement that the prime cause of failure is bad management. Good managers will seldom make the same fatal mistakes as poor managers or, if they do make them, their managerial ability will protect the company from the worst consequences.

2. One man rule

   'One-man rule is intended to describe chief executive who dominate their colleagues rather than lead them, who make decisions, in spite of their hostility or reticence, who allow no discussion, will hear no advice.

3. Non-participate board

   Many of the functional directors who sit on main boards, and many chief executives of subsidiary companies who do, take little part in discussions on matters affecting the company as a whole and only come alive when something is discussed that bears upon their particular special area of interests.

4. Unbalanced top team

   The team ' top team' includes directors and very senior executives and advisers below director level. The phenomenon of imbalance is plainly visible in many engineering companies where not only is the chief executive an engineer but so are most of the board.

5. Weak financial function

   A special case of unbalance in the top team, and in particular at board level, is a weak finance function. This may appear as a general phenomenon throughout

the company resulting in inadequate financial and accounting controls as described below under 'Accountancy information'.

6. Lack of management depth

   This also helps the autocrat to continue playing an exaggerated role in the company which is a useful indicator of possible failure.

7. Chairman-chief executive

   The chief executive is responsible to whom?

   He used to be responsible to shareholders but as their power has waned it has left a vacuum at the top of the pyramid that today is filled by anyone who is able to fill it. Sometimes it is the government, sometimes the workers, but usually it is top management and often the chief executive himself. Sometimes he uses his double power prudently, sometimes he abuses it, sometimes he simply goes stale or makes a mistake. There is no one above him to shake him awake or divert him or warn him or dismiss him.

8. Accounting information

   What is lacking in companies that fail is accountancy information; lack of physical information, such as output statistics stock levels or sales by area or customer complaints. Four defects are particularly mentioned.

   - budgetary control
   - cash flow forecasts
   - costing systems
   - valuation of assets

9. Change

   Each company must have the ability to react to changes when needed. It is useful to place the changes into five main groups: competitive, political, social, economic and technological environments. Change, or rather failure to respond to change, is a major cause of collapse, then. The company either does not notice the change or does not respond correctly. Of course, some changes occur so

suddenly and unpredictably that the company is wrong-footed and through no fault of its own, collapses.

10. Constraints

We have now a new cause of collapse. It is the trends to emergence of an atmosphere almost of hostility towards companies on the part of the customer, the employee, the state, students, and eventually even the man in the street. The demand that some form of accountability to society be devised for companies was heard all over the world. The belief that groups of people, other than shareholders, should draw a benefit from companies grew and spread and the belief that groups of people should not be harmed by companies in the pursuit of profit gained wide acceptance. These new views become so strongly held and so widespread that the freedom of companies to respond to change was decimated. Constraints have now become excessive and the companies should deal with the world as it is.

11. Overtrading

Number of writers and experts pointed to overtrading as a major cause of failure. When a company expands it has to inject cash into stocks, debtors and other aspects of the business at approximately the rate at which the company as a whole is expanding. Collapse from overtrading can occur in several ways, of which two are interesting. The first strikes at healthy as well as unhealthy companies and arises solely because the managers underestimate the amount they must borrow or the time it may take to arrange the loans. The second definition of overtrading seems to me more convincing for it relates to the company which, in an attempt to expand, increases, turn-over at the expense of profit margins. Now, let us suppose that turnover increases faster than profits then, in any attempt to finance an increase in stocks, debtors, and so on with borrowed money, the income-gearing of the company (i.e., the amount of interest on the borrowings in relation to profits) will rise. No company can continue to do that for long without arousing the suspicions of their bankers

who, on losing confidence in the company, will eventually decline to extend further credit.

12. The big project

There seems to be wide agreement that one of the almost tediously repetitive mistakes that lead to failure is the big project where costs and times are underestimated or revenues overestimated.

13. Gearing

There are unfortunately a number of different definitions of this term, which is also called 'leverage' in the USA. It can mean the volume of long-term fixed-interest loans as a percentage of total capital employed; thus a company whose equity is valued at $100m and has raised $30m debentures has a gearing of 23 per cent (or 30 per cent by some calculations). High gearing is a warning signal that no one should ignore.

14. Normal business hazards

The collapse of a company is in some ways, similar to the sinking of a ship. If a ship is in good condition and the captain is competent it is almost impossible for it to be, sunk by a wave or a succession of waves. Even if there is a storm, the competent captain will have heard the weather forecast and taken whatever measures ace needed. Only a freak storm for which quite inadequate notice has been given will sink the ship.

In view of this, a manager who blames an economic recession for his company's collapse is like a captain who has not heard the weather forecast. And what *does* that manager expect-a world without economic cycles? Some manage" blame the government; perhaps an increase in a tax or, some new legislation has 'caused' the failure. But again, what *does* he expect-a world in which taxes and laws are not changed? This is like the captain of a 'hip which is grossly overloaded blaming a *two-foot* wave for the, inking-and, in one sense, he is right; it *was* a *two-foot* wave that sank it! But what about all the other, ships near by which are, still afloat?

15. Financial ratios

Financial ratios are useful indicators of trouble and possibly of failure. A great deal of work has been done over the past several decades to establish the reliability of a number of financial ratios as indicators and the length of the list that follows is testimony to this work.

16. Creative accounting

Creative accounting can cause the failure of a company. While others believe that creative accounting is generally a symptom of failure, not a cause. To explain the creative accounting as a cause of failure the managers know perfectly well that the company is in trouble they refuse to admit it and start publishing the accounts in the most optimistic colour possible. They also know that if this becomes generally recognized the bank will tighten its credit terms, customers will begin to sidle away; suppliers will begin to demand cash on or before delivery. But worse than this the managers themselves will be seen to have failed. Their wives and children will see it and then their friends. A hard knot of anxiety ties itself in their minds

17. Non-financial symptoms

These non-financial symptoms differ for each industry and even each company. Generally a large number of such symptoms are displayed by failing companies. For example customers will note a decline in quality or service, suppliers will notice that the firm running down stocks of components or materials or reducing the size of orders, or taking longer to pay. Employees will observe the greater resistance to pay increases, cuts in overtime and less generous treatment generally, delays in capital expenditure authorizations, rising stocks, the outdated product, the declining market share, the growing volume of customer complaints and an increasing desperation among the top, and later the middle, management.

18. The last few months

In the last few months before insolvency the number and severity of the symptoms rapidly increase. At least four of the phenomena beginning to associate with the last stages of collapse were visible in this case. The continue generosity of the banks up to a few weeks before insolvency. Then the frantic, even lunatic, scramble to scrape up some cash accompanied by and parallel with, a marked deterioration of operating efficiencies. Finally the dazed astonishment of everyone-including the board, the stock market, the banks, the auditors, the government, and so on-when the announcement is made.

2.3 Models of failure

A distinct and different modeling technique is presented which can be applied to characteristics of individual companies to determine their likelihood of business failures. Many models are presented, and their application in the construction industry is described.

One of the pioneers of predicting business failure is Professor Edward Altman (1971, 1983). In the late 1960s, he developed a model for predicting failure tendency using a sample of 66 companies. Half of these companies had gone bankrupt. By analyzing different financial ratios of these firms, he developed a model that would fairly well distinguish between which the sixty six went to bankrupt and which are not. His model is well known as the Z-score model, shown in the following equation"

$$Z = 0.012A + 0.014B + 0.033C + 0.006D + 0.999E$$

Where,

A = working capital/total assets;

B = retained earnings/total assets;

C = earning before interest and taxes/total assets;

D = market value of equity/book value of total liabilities;

E = sales/total assets.

According to Altman, this model is a good indicator of bankruptcy tendency within two or three years from time of analysis. If the Z-score calculated was less than 1.81, this meant that the company was going to go failed in the next two or three years. Z-score greater than 2.99 meant that the company was not going to bankrupt. If the Z-score was between 1.81 and 2.99, the bankruptcy of the company was unclear.

The Z-score model was developed from companies that were not involved in construction. The group of companies used to develop the model was consistent in size. No firm with assets lower than \$1,000,000 was used and no firm with assets greater than \$25,000,000 was considered. In addition, as the ratios chosen suggests, all companies were public.

The model may be more applicable to construction firms with assets in the range for which the model was developed.

Another model was applied by Demister (1971, 1976). His model applied the technique of financial-ratio to determine the failure probability in small businesses. Using zero-one linear regression, Edmister developed the following model:

$Z = 0.951 - 0.423A - 0.23B - 0.482C + 2.77D - 0.452E - 0.352F - 0.924G$

Where,

A = ratio of annual funds flow to current liabilities, which equal to one if the ratio is less 0.05, but is zero otherwise;

B = ratio of equity to scale, which equal to one if the ratio is less than 0.07, but is zero otherwise;

C = ratio of net working capital to scales as described by Robert Morris Associate (RMA) average ratio, which is equal to one if the ratio is less than – 0.02, but is zero otherwise;

D = ratio of current liabilities to equity divided by the corresponding RMA average ratio, which is equal to one if less than 0.48, but zero otherwise;

E = ratio of inventory to sales divided by the corresponding RMA industry average, which is equal to one if the ratio has shown an upward trend, but is zero otherwise;

F = quick ratio divided by the trend in RMA quick ratio, which is equal to one if the trend is downward and the level prior to receiving the SBA loan less than 0.34, but is zero otherwise; and

G = quick ratio divided by RMA quick ratio, which is equal tone if the ratio has shown an upward trend, but is zero otherwise.

Using the failure criteria (if $Z > 0.53$, the company would not fail; and if $Z < 0.53$, failure occurs), the model predicted all of the failures and 86% of the nonfailures.

The use of Edmister's model is a stating point, however. Its use rather than the Z-score model developed by Altman would apply to the vast majority of construction companies and could assist them in staying away from failure.

Figure 2.4 shows an environment/response matrix. The causes of failure of small firms were expressed in this matrix by Boyle and Desai (1991). The environment is represented on the vertical axis and is divided into two categories, internal and external environment. Internal environment represents the events that are under management's control. External environment corresponds to events that are beyond management's control. Response is represented on horizontal axis and also is divided into two categories, namely administrative responses, which represent the short-term operational activities, and the strategic responses, which represent the long term planning of the firm. This matrix is adapted to the construction industry by using the factors used in Dun and Bradstreet's annual Business Failure Records (1989-1993).

Figure 2.4 Environment/response matrix (Boyle & Desai 1991)

Environment	Internal: Events under management control	CELL I	CELL II
	External: Events not under management	CELL III	CELL IV
		Administrative Systems and procedure	Strategic Long term planning
		Response	

In matrix (Fig. 2.4) Cell I covers the internal-administrative factors, consists of budgetary and human capital issues. Cell II covers the internal-strategic factors, represents issues of adaptation to market conditions including sales, competitiveness, growth and expansion. Cell III covers the external-administrative factors, expenses business issues that cover the characteristics of the individuals who manage the companies, and business conflicts. Finally Cell IV covers the external–strategic factors, includes natural factors and macroeconomic issues such as industry weakness and interest rates.

The issues in Figure 2.4 are expanded using factors that define each issue. These factors are very causes of failure whose percentages of occurrence in the construction industry are given by Dun and Bradstreet. The percentages of occurrence of these factors over 5-year period 1989-93 are calculated and listed in the environment/response matrix in Figer 2.5.

Figure 2.5 Environment/response matrix distribution with failure factors

Environment	Internal: Events under management control	CELL I • BUDGETARY ISSUES • HUMAN AND ORGANIZATIONAL CAPITAL ISSUES	CELL II • ISSUES OF ADAPTATION TO MARKET CONDITIONS
	External: Events not under manageme	CELL III • BUSINESS ISSUES	CELL IV • MACROECONOMIC ISSUES
		Administrative Systems and procedures	Strategic Long term planning
		Response	

An alternative approach to explaining the reasons of business failure in the construction industry is the classification of Dun and Bradstreet in the form of input/output model Figer 2.7. In this model, organizational and environmental factors influence a company's success or failure individually, jointly or indirectly through company performance factors.

Beaver (1966) developed a model based on four propositions: 'the larger the reservoir, the smaller the probability of failure; the larger the net liquid asset flow from the operation (i.e. cash flow), the smaller the probability of failure; the larger the expenditure for operations, the greater the probability of failure; the larger the amount of debt held, the greater probability of failure (Arditi, Koksal & Kale, 2000)

Figure 2.6 Environment/response matrix distribution with failure factors for the 5-year period 1989-1993.

		CELL I	CELL II
Environment	**Internal: Events under management control**	**BUDGETARY ISSUES** Weighted (%) Occurrence Insufficient profits ……….…… 26.71 Heavy operating expenses …….... 17.80 Insufficient capital ……………… 8.29 Burdensome Institutional debt ….. 5.93 Receivable difficulties ………….. 1.46 **HUMAN AND ORGANIZATIONAL CAPITAL ISSUES** Lack of business knowledge ……. 3.89 Lack of managerial experience .… 0.91 Fraud ……………………………..0.85 Lack of line experience …………. 0.68 Lack of commitment …………… 0.62 Poor working habits ………….... 0.59 **TOTAL: 67.73**	**ISSUES OF ADAPTATION TO MARKET CONDITIONS** Weighted (%) Occurrence Inadequate sales …..……………. 2.20 Not competitive.………………….. 0.29 Over expansion …….....………….. 0.15 **TOTAL: 2.64**
	External: Events not under management control	**CELL III** Weighted (%) Occurrence **BUSINESS ISSUES** Business conflicts …..……………..2.43 Family problems ……………….... 1.16 **TOTAL: 3.59**	**CELL IV** Weighted (%) Occurrence **MACROECONOMIC ISSUES** Industry weakness ……….…….… 22.73 Poor growth prospect …………… 0.28 High interest rates ……………….. 0.06 **Natural factors** Disaster ………………....……….. 2.94 **TOTAL: 26.01**
		Administrative Systems and procedures	**Strategic Long term planning**
		Response	

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Fig. 2.7 Input/output model of business failure in the construction industry (Ardiri, 2000)

ORGANIZATIONAL

FACTORS

Human, organizational and financial capital (17.14%)
- Lack of business knowledge.
- Lack of managerial
  experience.
- Lack of line experience.
- Lack of commitment.
- Poor working habits.
- Over expansion.
- Family problems.
- Fraud
- Insufflaient capital

ENVIRONMENTTAL

FACTOR

Macroeconomic and natural factors (26.01%)
- Industry weakness
- Poor growth prospects
- High interest rates
- Disaster

PERFORMANCE

(56.82%)
Insufficient profits
Heavy operating expenses
Burdensome institutional debt
Receivable difficulties
Inadequate sales
Not competitive
Business conflcts

BUSINESS FAILURE

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2.4 Types of failure

There must be several very different paths or trajectories of company failure. Harvey described several examples of companies which failed without ever making any profits; at the same time Altman said that over 50% of the firms that failed were less than five years old (John Argenti, 1976). Roll-Royce is different example. It was a highly profitable company for several decades. So there are certainly three types of failure. The three types of failure will be described below (Figure 2.8). Type 1 failure follows a very low profile, indicating that its performance never rises above 'poor' before sinking. Type 2, on the other hand, shoots upwards to 'fantastic' heights before crashing down again. Type 3 is a rather more complex trajectory; these companies have usually been going for years or decades so the start and early years are not shown. As a comparison, the trajectory for a healthy non-failing company which follows the well known S-curve consisting of a slow start, a rapid build-up and then an indefinite period of stable 'good to excellent' performance.

Figure 2.8 Types of failure (Arginti, 1976)
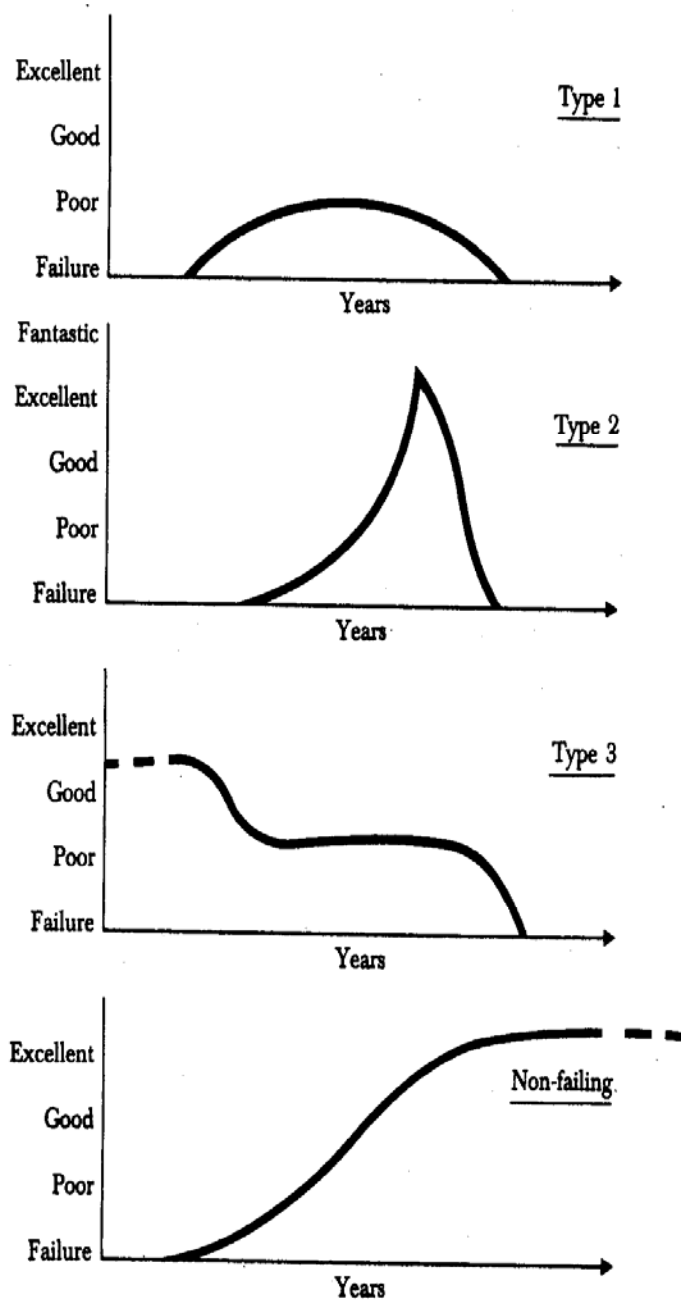
2.4.1 Description of Type 1

Type 1 failure occurs only to companies newly formed and, almost invariably therefore, affect only small ones. Type 1 failure is low and brief. The general health of the

company probably never rises above 'poor and' and it probably fails within five years. At point 1 the type 1 trajectory (see figure) at the launch of the company, a number of defects will be seen. There will be one-man rule because the company may only have one manager and lack of management depth. At point 2, there will be no budget, no cash flow plans, and no costing system. At point 3 the company will either obtain a bank loans or bought equipment on hire purchase. At point 4 the company may launches a big project. Type 1 companies begin life with four serious defects.

At point 5 it becomes clear that the proprietor has in fact seriously underestimated the cost and overestimated the revenues of the projects the company was formed to launch. Point 5 may well occur within months of the start of the company. At point 6, the cash flow are probably still negative and so are profits; all the financial ratios look poor. At point 7 the proprietor may begin creative accounting because he expects to have ask the bank for a further loan. At point 8 several other non-financial symptoms will appear. At point 9 a normal business hazard occurs, such as a strike. At point 10 the proprietor takes some form of crisis action such as cutting the selling prices to customers. At point 11 he seeks further loans although his net assets are probably negative. Either he obtains more capital, in which case at point 12 he finds he cannot make enough profit to maintain the interest payments, or he does not; in either case the Receiver is called in point 13. However, the main feature of Type 1 failure, that they 'never got off the ground. 60 per cent of all failures are of this type.

Figure 2.9 Type 1 failure (Arginti, 1976)
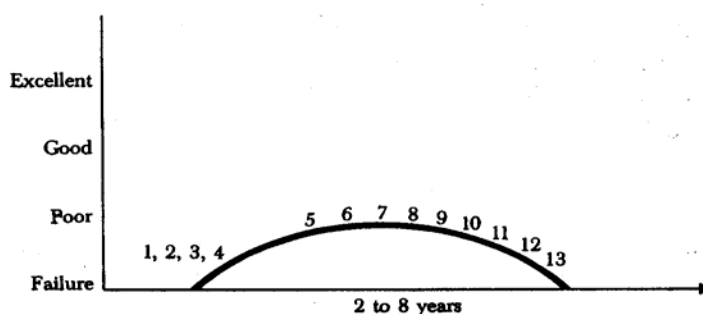
2.4.2 Description of Type 2

Type 2 failures also occur to very young companies although they usually survive longer than Type 1. The trajectory is wholly different from Type 1, the companies get off the ground. At point 1 the same management defects as in Type 1are seen. Type 2 trajectories diverge from Type 1 at point 3. Sales continue to expand rapidly necessitating new capital resources (point 4) and these resources are readily made available (point 5). No over gearing or overtrading occurs. Offers of capital are received in some profusion (point 6) and sales and profits continue to rise (point 7).

The company has reaching 'good' at point 8. At point 9 the company is noticed by the press and the company has to succeed because it is publicly expected to, so it has to sell more, so it has to borrow more, so it has to succeed more. By point 10 the company is now so large. At point 11, whether it has 'gone public' or not the proprietor himself is now extremely wealthy and his name is known. At point 12 turnover grows again-but this time the profit do not. No one knows that this inevitable turning point has been reached because creative accounting begins immediately at point 13. At point 14, then, we find the most entertaining non-financial symptoms. Technically they are overtrading, for turnover has now risen so long and so fast that the bankers begin not to believe their luck and, at point 16, they refuse further advances. But point 16 is on the downswing of the trajectory; something happens at point 15 to turn it down. Sometimes it is normal business hazards. The collapse is now quite swift and no creative accounting can stop the collapse to point 17. The Receiver is called to point 18.

Figure 2.10 Type 2 failure (Arginti, 1976)
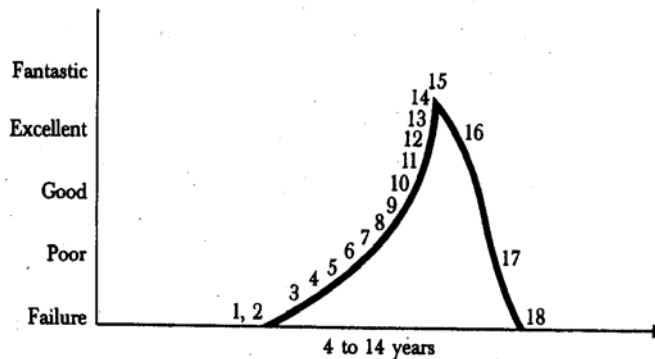
2.4.3 Description of Type 3

Type 3 failures occur only to mature companies which have been trading successfully for a number of years or decades. Type 3 failures are considerable-probably between 20 per cent and 30 per cent of all failures. At point 1 the company has been and remains 'good to excellent' with turnover rising soberly in real terms, profit margins good, gearing low, morale good and so on. At point 2 several defects must be recorded in management structure, namely one-man rule or non-participating board or weak finance function. At point 3 certain defects in the accounting information systems are noted. At point 4 one can observe that although a major change has occurred no adequate response has been made. It is well worth noting that these defects at point 2,3 and 4 are visible for months or years before the initial collapse occurs at point 5. An overtrade, a failed project, a constraint, or a hazard occur in any permutation of two or more. Following these events, profits fall severely at point 6. At point 7 the financial ratios deteriorated. At point 8 morale falls and other non-financial symptoms appear. At point 9 profits have still not recovered even though it may not now be one or two years after point 5. At point 10 creative accounting begins, partly because the managers realize that they need a large loan. This is obtained at point 11, lifts gearing to dangerous levels. At point 12, profit levels out at last but at a volume that does little more than cover the interest payments. The general health of the company is 'poor' or a little above. At point

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13 the managers will either launch a new ambitious project or launch a campaign to expand sales from existing facilities. At point 14 sales and profits will rise due to efforts and the apparent health of the company will improve. Point 15 is a repeat performance of point 5-except that, in this case the company is already waterlogged. At point 16 profits fail to cover interest payments, a cash flow crisis occurs and all the drama of the last few months begins. At point 17 the Receiver is called in.

Figure 2.11 Type 3 failure (Arginti, 1976)
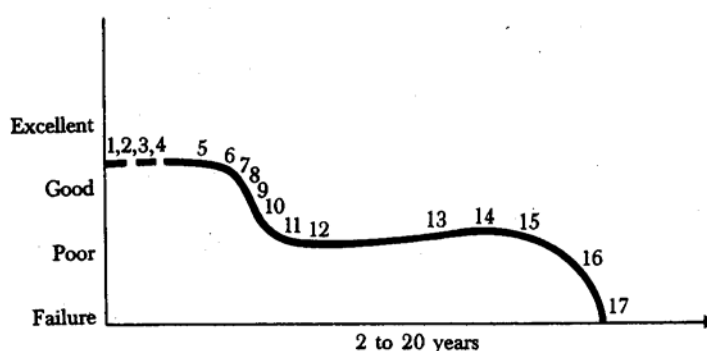
A company following one trajectory could switch to another. The most obvious occasion for a switch is the rescue of a company. Thus Type 3 company, having suffered its initial collapse to point 12 might be rescued and then live happily ever after as shown in Figure . Type 2 might be rescued either before it becomes absurd at point 14 (Figure) or on its way down after the peak (see Figure). Alternatively an entirely healthy company could be taken over by a manager of unusual ambition who, in his attempt to achieve fame and fortune breaks the company. Figure shows a switch in trajectory from a non-failing trajectory to Type2. Any change from one style of top management to another can caused a switch from trajectory to another.

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Figure 2.12 Rescue of the three types of failure (Arginti, 1976)
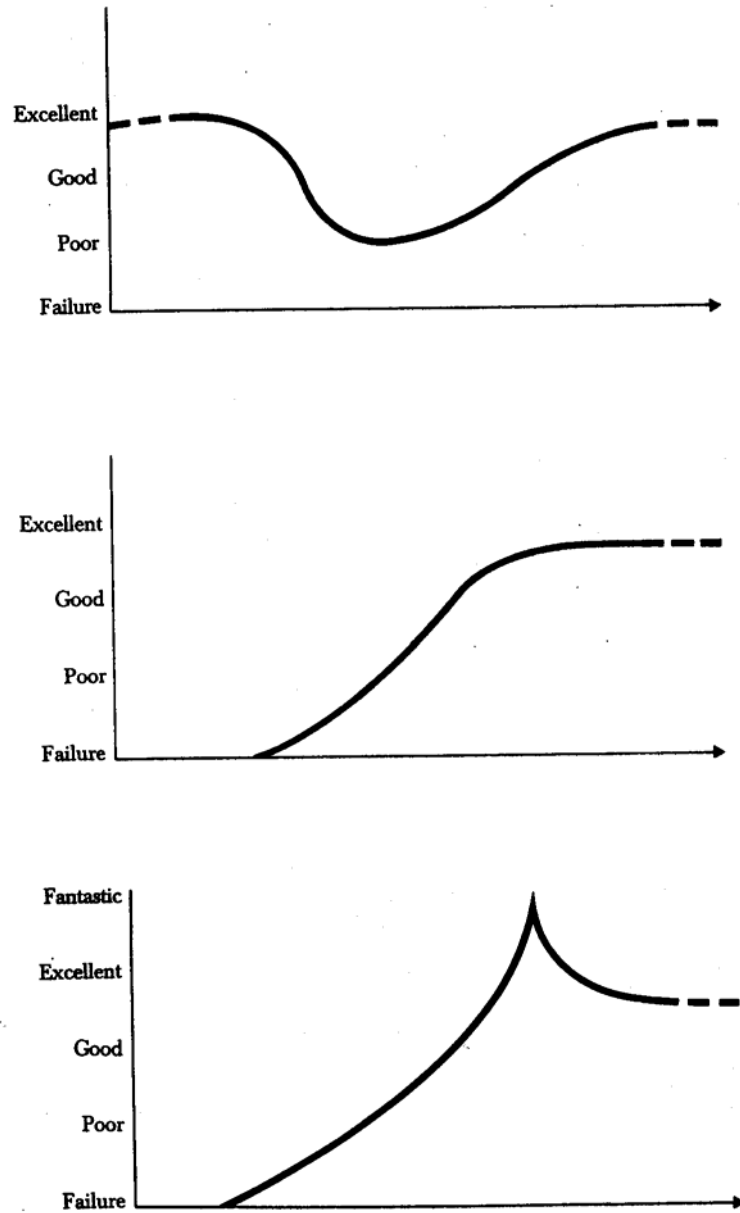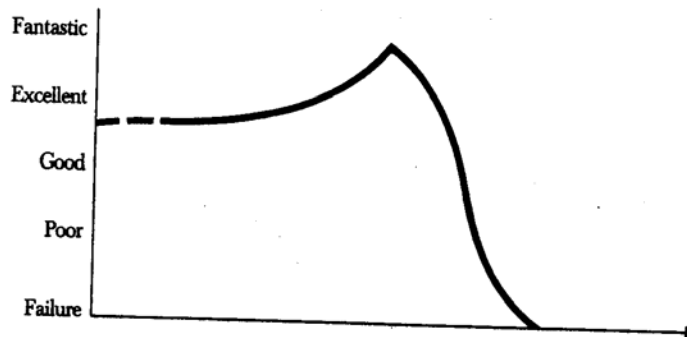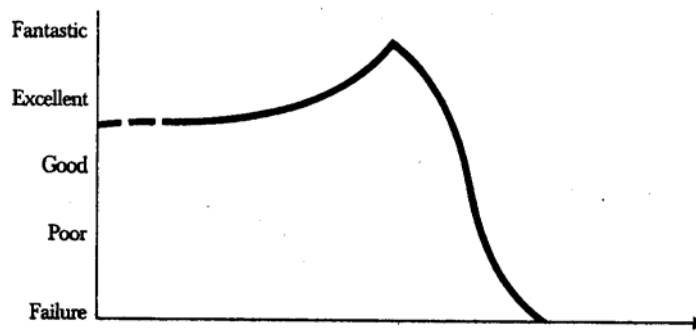
2.5 Prevention and cure of failure

Type 1 companies are nearly always very small. The concern should be for the proprietor. When Type 1 company fails it is he who usually loses most, as it never got off the ground, very few other people are deeply dependent upon it. It fails because the proprietor has very seriously overestimated the revenues or underestimated the costs of his project. Type 1 failures cannot be cured. In this case prevention is better than cure.

A completely different situation confronts us with Type 2 company failures. For one thing, they grow so large that a great number of people other than the proprietor become dependent upon them. For another, there is usually a profitable core that is well worth salvaging even after insolvency. Cure of Type 2 company may take many forms such as cutting back or selling off any unprofitable activities or a takeover may be arranged.

41

Prevention may take the form of constraining the chief executive's excesses of enthusiasm.

Again the problem is different with Type 3 failure. The companies here is often large or medium-size one upon which a number of people have already become dependent. Both prevention and cure are possible; cure is possible along almost the whole length of the very long trajectory.

Chapter 3

Methodology

This chapter includes the different methods used to identify the research strategy.

3.1 The research strategy

The research strategy can be defined as the way in which the research objectives can be questioned (Naoum, 1998). There are two types of research strategies, namely, 'quantitative research' and "qualitative research' (Naoum, 1998). Quantitative data, as the term suggests, consist of numerical (quantified) information (Polit & Hungler, 1985). Quantitative research is "objective" in nature. It is selected under the following circumstances:

- When you want to find facts about a concept a question or an attribute.
- When you want to collect factual evidence and study the relationship between these facts in order to test a particular theory or hypothesis (Naoum, 1998).

Qualitative research is 'subjective' in nature (Naoum, 1998). It emphases meanings, experiences (often verbally described) description so on.

Qualitative data consists of detailed descriptions of people, events, situations, or observed behavior (Polit & Hungler, 1985). It is used when you have a limited amount of knowledge about the topic (Naoum, 1998). The strategy used in this thesis is the quantitative research because of these well known advantages such as, formal, descriptive, exploratory, and correlated.

3.2 The research design

Burns & Grove (1987) defined the term design as:

"Some consider research design to be the entire strategy for the study, from identifying the problem to find plans for data collection. Other limit design to clearly define structural framework within which the study is implemented". The framework that the researcher creates is the design (Wood & Haber, 1998). The purpose of the

research design is to provide the plan for answering research problem (Wood & Haber, 1998).

Much research in the social sciences and management spheres involves asking and obtaining answers to questions through conducting surveys of people by using questionnaires, interviews and case studies (Fellow and Liu, 1997). The interrelationships between problem statement, purpose, literature review, theoretical framework, and hypothesis are shown in figure 3.1.

Figure 3.1 Interrelationship of design, problem statement, literature review, theoretical framework, and hypotheses (wood and Haber, 1998).
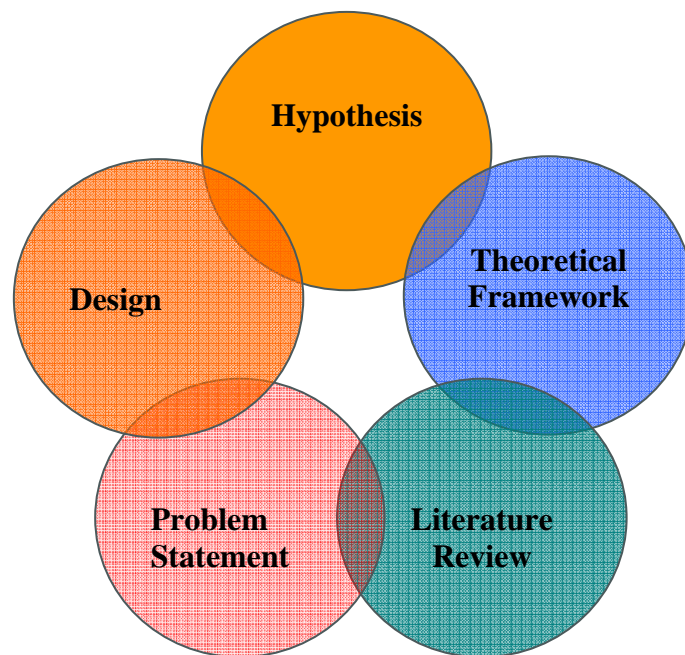
A structured questionnaire with personal interview will be used together in this research for their advantages (Sawalhi, 2002). The structured questionnaire is probably the most widely used data collection technique for conducting surveys to find out facts, opinions and views (Naoum, 1998). Figure 3.2 shows the research design.

Figure 3.2 Research design

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                    ┌─────────────────────────┐
                    │        Concept          │
                    └─────────────────────────┘
                                 │
                                 ▼
                    ┌─────────────────────────┐
                    │    Literature Review    │
                    └─────────────────────────┘
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                    │      Define Factors     │
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         ┌─────────▶│   Questionnaire Design  │◀─────────┐
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                    │   Discussion of Results │
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                    │ Conclusions & Recommendations│
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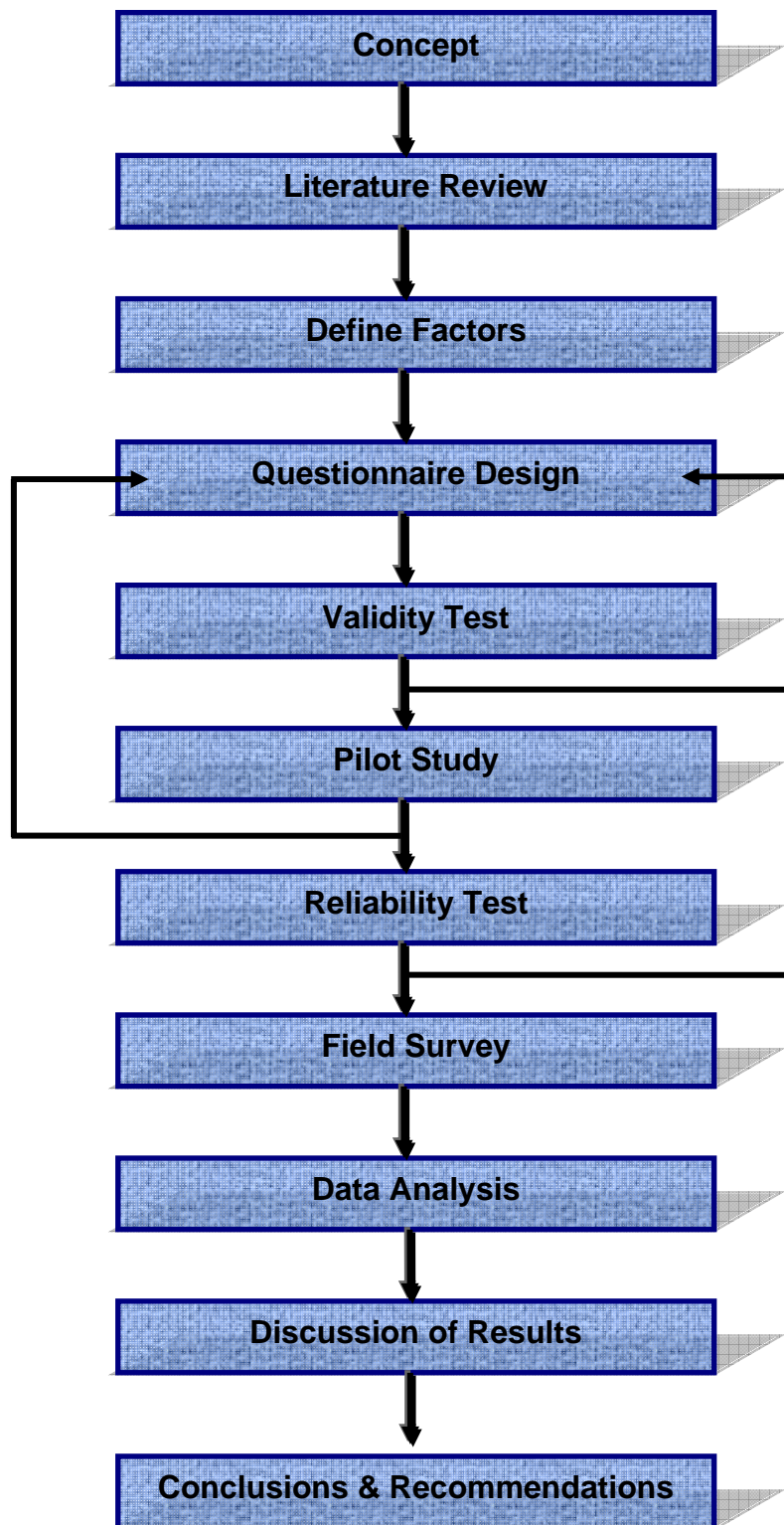
3.3 Research population

A population consists of the totality of the observations with which we are concerned (Walpole and Myers, 1998). In this research, the population is the total number of contractors (92 contractor) of the first, second and third category who have valid registration by the Contractors Union.

3.4 Sample size

Sampling is the process of selecting representative units of a population for study in research investigation (Wood and Haber, 1998). A statistical calculation is used to insure that the chosen sample fully represents the population. Registered number of first class is 47 companies; the second class is 32, while the third class is 13 companies. The formula shown below was used to determine the sample size of unlimited population (Creative Research Systems, 2001)

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

Where SS = sample size.

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

P = percentage picking a choice, expressed as decimal (0.5 used for sample size needed)

C = confidence interval (0.5)

$$ss = \frac{1.96^2 * 0.5 * (1 - 0.5)}{0.5^2} = 384$$

Correction for Finite Population

New $SS = \dfrac{ss}{1 + \dfrac{ss - 1}{pop}}$

Where pop = $SS = \dfrac{384}{1 + \dfrac{384 - 1}{92}} = 74.4 \xrightarrow{=} 75$

To ensure good representation of each stratum, the following was done:

First class $= \frac{75 * 47}{92} = 38$

Second class $= \frac{75 * 32}{92} = 26$

Third class $= \frac{75 * 13}{92} = 11$

3.5 Limitation of the research

The study is limited to the contractors who have valid registration through the Contractors Union. All other organizations who has its own classification for contractors such as UNRWA, UNDP, etc. will be excluded. Also, contractors of first, second, and third class represent the population in this research, while contractors of fourth and fifth category will be excluded. Finally, this study is limited to the contractors in Gaza Strip.

3.6 Sample method

Simple random sampling was used to represent the total sample size, since it is the most basic of the probability plans. A list of population was done and then numbered. Numbers were written on slips of paper, placed in a container, mixed well and then drawn out one at a time until the desired sample size has been reached. Table 3.1 shows the result of the previous method.

Table 3.1 Population sample

Class	Number of companies (population)	% of population	Number of companies of sample
First	47	50.67	38
Second	32	34.67	26
Third	13	14.67	11
Total	**92**	**100**	**75**

3.7 Questionnaire design:

A closed-ended questionnaire was used for its advantages such as: it is easy to ask and quick to answer, they require no writing by either respondent or interviewer, and their analysis is straight forward (Naoum, 1998). The factors that cause failure to contractors were defined through a detailed literature review. These factors were translated into questions of simple, easy, unambiguous form.

Questions of similar topics were grouped together to build the main areas of the draft questionnaire.

The draft questionnaire was discussed with supervisor who gave a valuable advice and comments. After preliminary approval of supervisors, draft questionnaire was discussed with two statistical experts and ten of well known construction managers to evaluate the content of the questionnaire. Modifications and changes have been done to questions.

A pilot study was conducted which added a very important questions, clarify some questions and change the contents of others. The questionnaire was divided into two main areas: the first was the company profile and the second was the factors that cause contractors failure. The factors that cause contractors failure were divided into four main groups:

- Management group
- Financial group
- Expansion group
- Political group

List of the groups are listed in Table 3.2 below:

Table 3.2 Main and sub-factors group

No.	Main Factor Group	Sub-factor group
1-	Management group	Lack of experience in the line of work
		Lack of experience in contracts
		Bad decisions in regulating company policy
		Neglect
		Procurement practices
		Control system
		Labor productivity and improvement
		Replace key personnel
		Owner absence from the company
		Commitment
		One man rule
		Inflation in the number company employees
		Company organization
		Use of project management techniques
		Assigning site engineer
		Internal company problems
		Competent consultation
		React to change
		Using of documentation system
		Frauds
		Communication system
		Using computers applications
		Claims
		Depending on banks and paying high intrests

2-	Financial group	Cash flow management
		Lack of capital
		Low margin of profit due to competition
		Estimating practices
		Mistiming of capital expenditures
		Bills collecting effectively
		Difference of local currency exchange with contract currency
		Evaluation of profit yearly
		Material wastages
		Controlling equipment cost and usage
		Dealing with variation order
		Employee benefits and compensation
3-	Expansion group	Lack of managerial development as the company grow
		Increase size of projects
		Change in the type of work
		Increase number of projects
		Change work from private to public or vice versa
		Opening a regional office in other governorates
4-	Environment group	Absence of construction regulations
		Award contracts to lowest price
		National slump in economy
		Absence of specialized courts
		Owner involvement in construction phase
		Accounting and tax practices
		Insufficient award of contracts
		Bad weather
		Delay in collecting dibs from clients

5-	Political group	Closure
		Segmentation of Gaza Strip
		High cost of materials
		Lack of resources
		Limitation on importing
		Monopoly
		Banks policy
		Dealing with suppliers and traders

3.8 Validity of research

Validity refers to the degree to which an instrument measures what it is supposed to be measuring (Pilot and Hungler, 1985). High validity is the absence of systematic erros in the measuring instrument (Hjertzen and Toll, 2001). When an instrument is valid, it truly reflects the concept it is supposed to measure (Wood and Haber, 1998). Validity has a number of different aspects and assessment approaches (Polit and Hangler, 1985). Below several routes to evaluating an instrument's validity are listed:

- Content validity
- Criterion-related validity
- Construct validity

Questionnaire was reviewed by two groups of experts. The first was requested to identify whether the questions agreed with the scope of the items and the extent to which these items reflect the concept of the research problem. The other was requested to identify that the instrument used is valid statistically and that the questionnaire was designed well enough to provide relations and tests between variables. The two groups of experts do agree that the questionnaire was valid and suitable enough to measure the concept of interest with some amendments.

3.9 Reliability of the research

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

In this study, the correlation coefficient, according to Pearson, between two respondents was (0.914) which is a high level of reliability and the correlation is significant at 0.01 level.

3.10 Data collection

Data collection was based on personal interviews for filing questions. The personal interview, which is a face-to-face process, in which the respondents were asked questions with a brief explanation for the ideas and contents of questionnaire, was conducted. The number of respondents who agreed to cooperate was 65 out of 75 which represent 87% of the sample.

3.11 Coding and data entry

The use of computers requires that answers by respondents must be translated (coded) into numbers before the actual data analysis (Wesberg & Bowen, 1977). The coding process for closed-ended questions consists of recording the number of the response a particular respondent gave to the question (Sawalhi, 2002). The response categories must be mutually exclusive, so no answer can fit more than one of the categories (Wesberg & Bowen, 1977). A data summary sheet is needed before starting any form of data analysis. The actual process of transferring the data from questionnaire or data collection form (after the data have been collected) into a data

summary sheet is, called the 'recording scheme' or 'production coding' (Naoum, 1998).

3.12 Measurement scales

In order to be able to select the appropriate method of analysis, the level of measurement must be understood. For each type of measurements, there is/are an appropriate method/s that can be applied and not others (Naoum, 1997). In this research, nominal and ordinal scales were used. Nominal scale is nominal numbering implies belonging to classification or having a particular property and a label (Naoum, 1998). It does not imply any idea of rank or priority. It is a conventional positive integer. Ordinal scale is a ranking or a 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 (Naoum, 1998). Only ordinal scale was used in this research as follows:

  1 very low influence

  2 low influences

  3 moderate influence

  4 high influence

  5 very high influence

3.13 Data Analysis

Analysis is an interactive process by which answers to be examined to see whether these results support the hypothesis underlying each question (Backstrom and cesar, 1981). Quantitative statistical analysis for questionnaire was done by using Statistical Package for Social Sciences (SPSS). The analysis of data is done to rank the severity of causes of contractor's failure in Gaza Strip. Ranking was followed by comparison of mean values within groups and for the overall sub-factors. The opinion of contractors regarding the severity of each cause was checked by analysis of variance (ANOVA).

The following statistical analysis steps were done:

- Coding and defining each variable

- Summarizing the data on recording scheme

- Entering data to a work sheet

- Cleaning data

- Mean and rank of each cause

- Comparing of mean values for each main group and overall sub-factors

- ANOVA test was done to test the difference of answers of contractors regarding to variables

- Partial correlation test was done to compare the mean values of different groups

- Multi-comparison test was also done when there is a significant difference

Chapter 4

Results

The survey results are illustrated in this chapter. Mainly, the population characteristics, the ranking of factors affecting contactors failure, the relationships between the population characteristics and the factors (variables) are investigated by using statistical tests.

4.1 Population characteristics

4.1.1 Year of establishment

Nearly more than half of contracting companies (50.8%) were established after one or two years of the existence of the Palestinian National Authority (PNA). Only (18.2%) of the companies were established before the existence of PNA. Table 4.1 shows the distribution of year of establishment of respondents.

Table 4.1 Year of establishment

Year	Frequency	Percent	Cumulative Percent
1973	1	1.5	1.5
1980	1	1.5	3.1
1982	1	1.5	4.6
1983	1	1.5	6.2
1985	1	1.5	7.7
1991	1	1.5	9.2
1992	6	9.2	18.5
1993	5	7.7	26.2
1994	21	32.3	58.5
1995	12	18.5	76.9
1996	5	7.7	84.6
1997	2	3.1	87.7

1998	1	1.5	89.2
2000	4	6.2	95.4
2001	3	4.6	100
Total	**65**	**100**	

4.1.2 Distribution of respondent's occupation

Figure 4.1 Respondent occupation
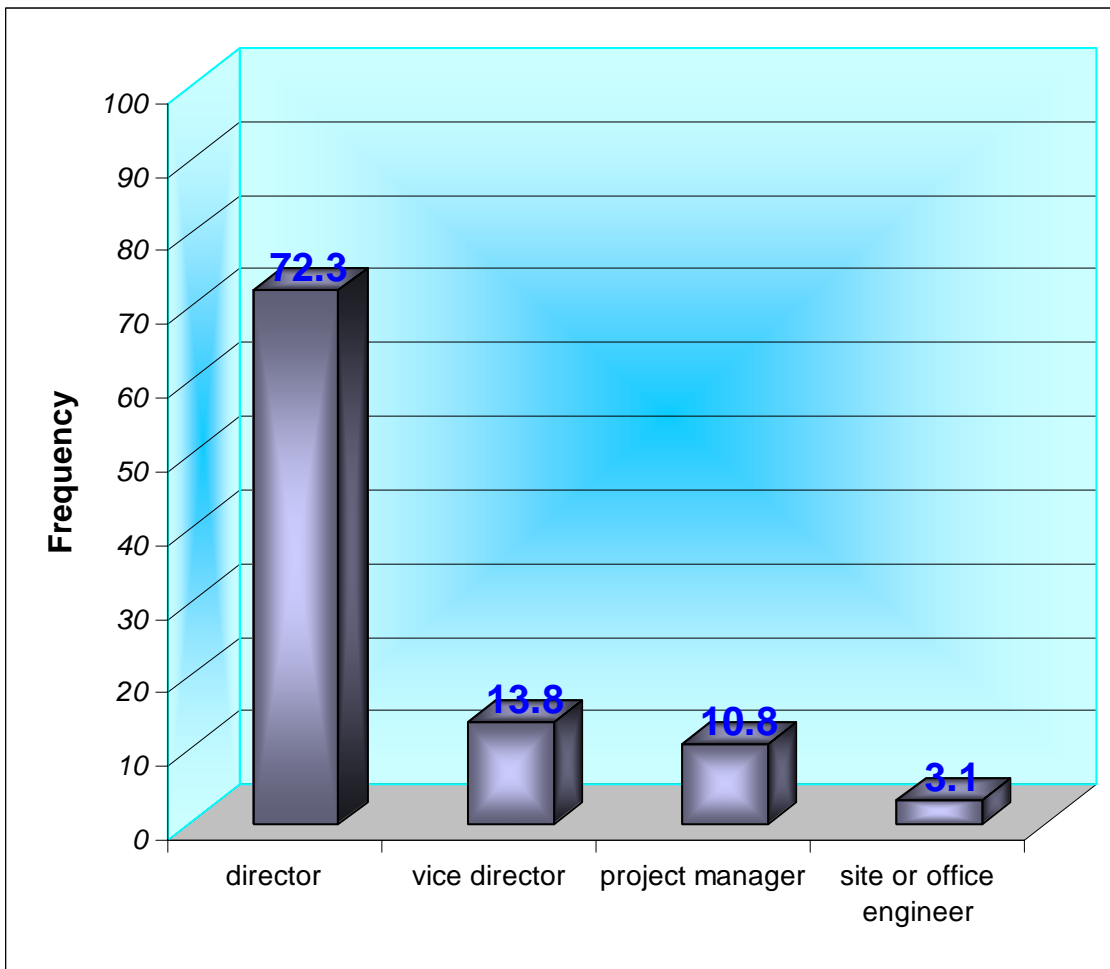
The distribution of respondent's occupation is shown in Figure 4.1 which illustrate that

86.1% of respondents were director or vice director. This gives an indication of high

interest of respondent and good confidence of answers.

4.1.3 Distribution of number of company staff

As shown in Figure 4.2, more than half of the contractors (56.9%) have from 7-14 employees. 32.3% of contractors have less than 7 employees, while only (10.8%) of contractors have more than 14 employees. This means that contractors depend on frequent employment of projects or they have small size organizations.

Figure 4.2 Number of company staff
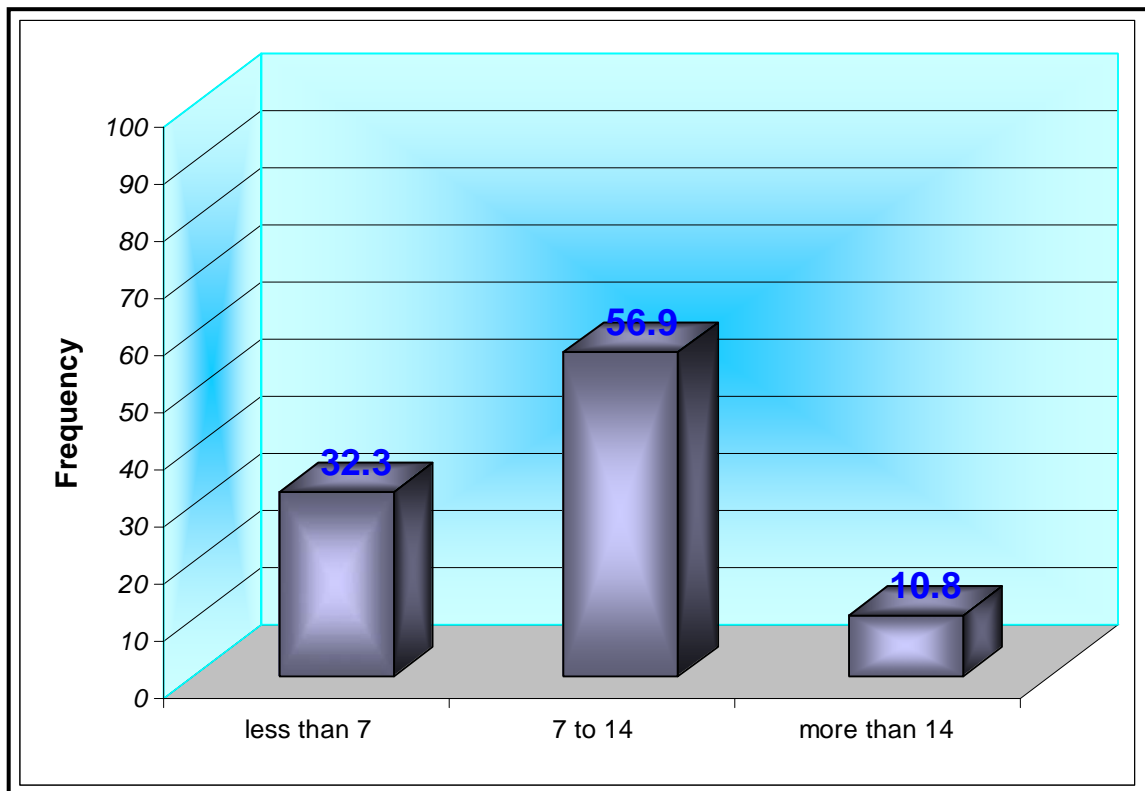
4.1.4 Distribution of number of labors

As shown in Figure 4.3, approximately two-third (67.7%) of contractors has less than 50 labors. This gives an indication of the small size of organization and the small size of executed projects.

Figure 4.3 Number of company labors in the last 5 years
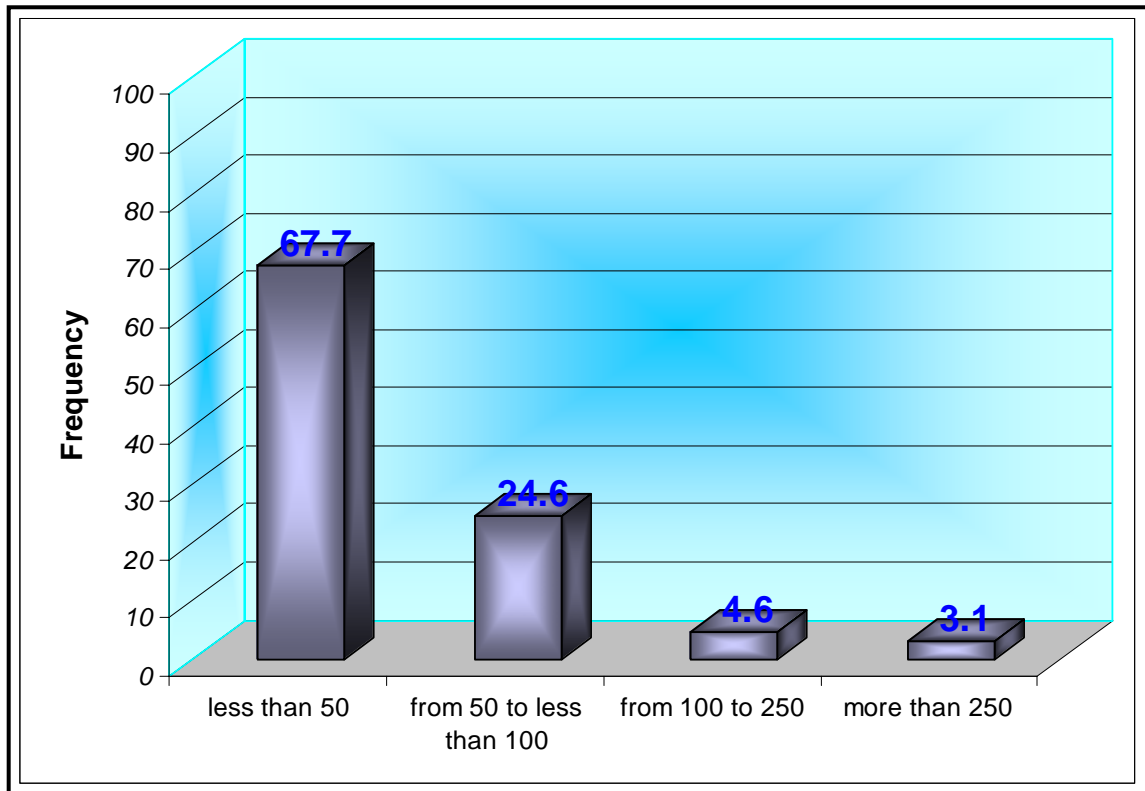
4.1.5 Distribution of number and value of projects

Figure 4.4 shows that 58.4% of contractors have executed less than 20 projects during the last five years. Figure 4.5 illustrate that 60% of contractors have completed projects of value less than 5 millions dollars during that period. This may be another example of small size organizations and economic weakness.

Figure 4.4 Number of executed project in the last 5 years
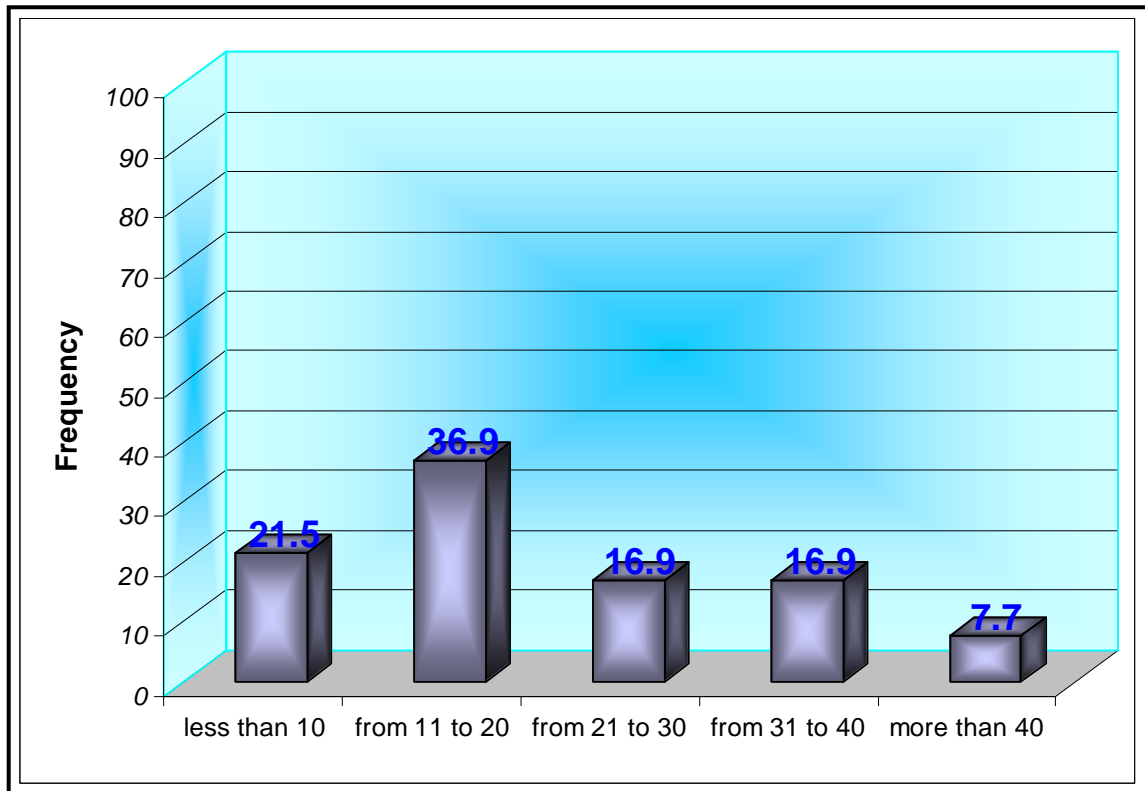
Figure 4.5 Volume of work during the last 5 years
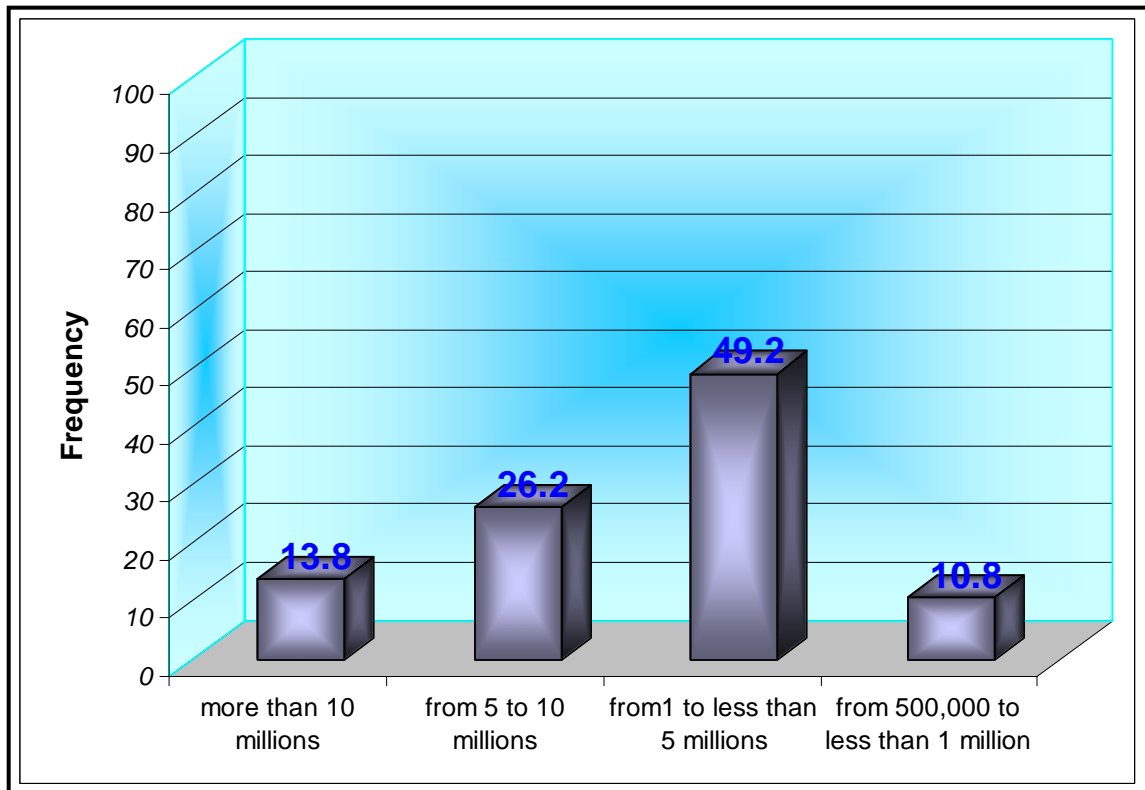
4.1.6 Distribution of years of experience

Figure 4.6 shows that 81.5% of contractors have more than 5 years of experience. This gives a higher confidence in the quality of answers.

Figure 4.6 Years of experience
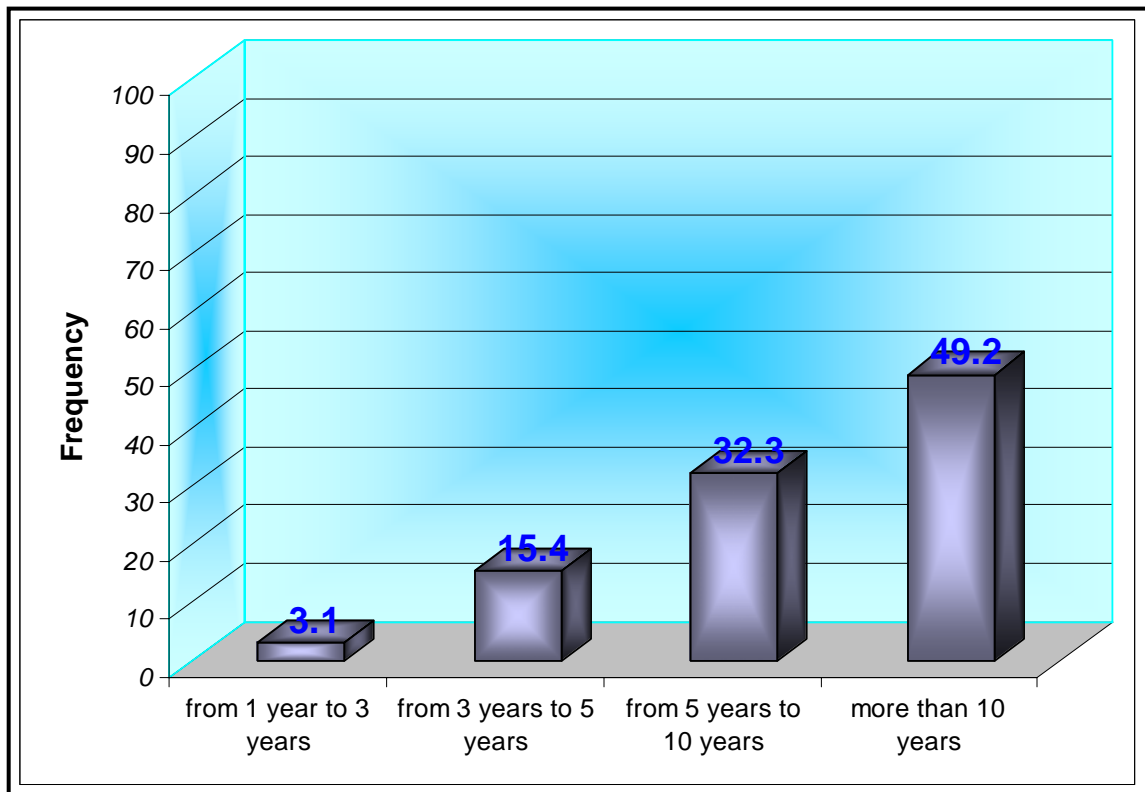
4.1.7 Distribution of company classification and field of work

Figure 4.7 illustrates that 52.3% of contractors are of first class, 32.3% of them are of second class, while only 15.4% of them of third class. This distribution indicates that the requirement of classification system which leads the class A dominates is so easy.

Figure 4.7 Company classification
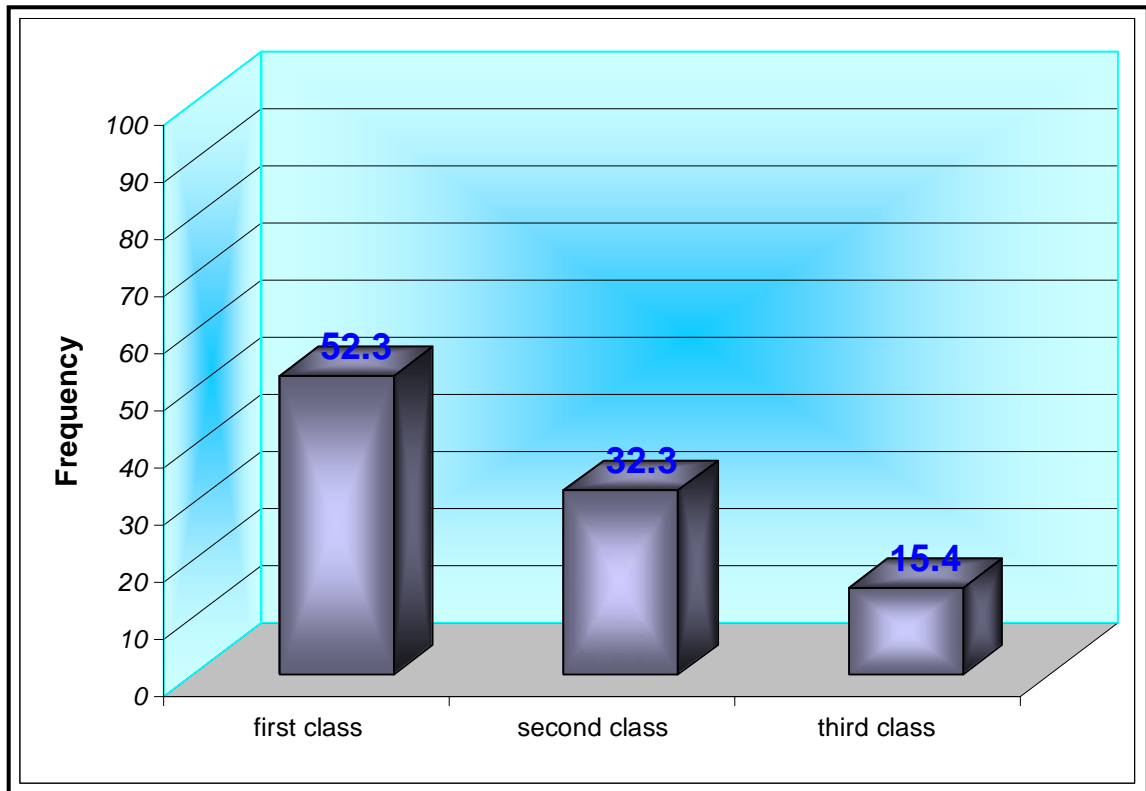
Figure 4.8 shows that 63.1% of the contractors are involved in construction building works, while 10.8% of them are involved in infrastructure works. Only 26.2% of contractors were working in both construction and infrastructure.

Figure 4.8 Company field of work
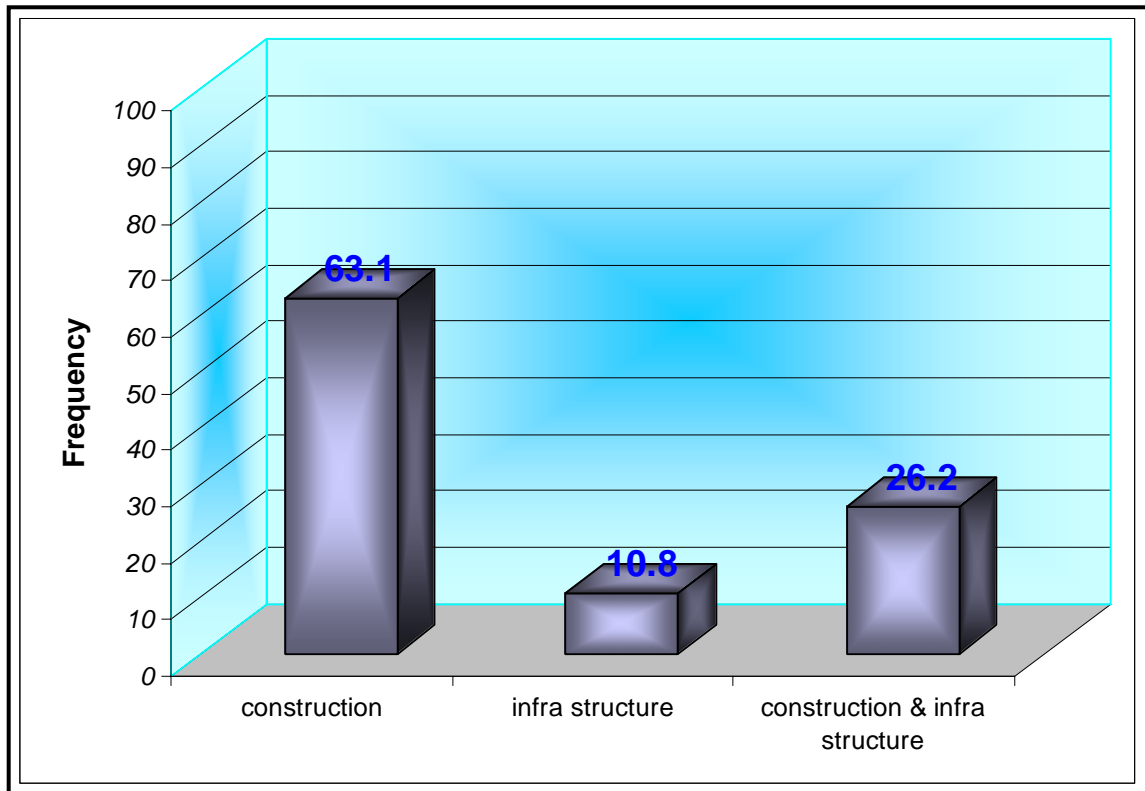
4.2 Causes of contractors failure

4.2.1 Main groups

As mentioned before, the main groups of factors affecting contractor's failure were managerial group, financial group, expansion group, environment group, and political group. As illustrated in Table 4.2, the mean and ranking of each group is listed below. The most severe group of factors that causes contractor's failure was political group of mean 3.94. Expansion and environment groups had the same mean although each group had different sub-factors and different numbers of factors.

Table 4.2 Mean and ranking of main groups

No	Main group	Mean	Ranking
5	Political group	3.9487	1
2	Financial group	3.7540	2
1	Managerial group	3.5262	3
3	Expansion group	3.4385	4
4	Environment group	3.4385	4

4.2.2 Mean and ranking of sub-factors

4.2.2.1 Managerial group

The mean of each of the sub-factors of the managerial group is presented in Table 4.3 in a descending order. Rank of each factor is also listed. Lack of experience in the line of work and experience of contracting had the highest means respectively. While, claims, had the lowest rank in the same group.

Table 4.3 Means and ranking of managerial sub-factors

No	Sub-factor	Mean	Rank
1.	Lack of experience in the line of work	4.25	1
16.	Lack of experience in contracts	4.15	2
4.	Bad decisions in regulating company policy	4.03	3
14.	Neglect	3.91	4
8.	Procurement practices	3.75	5
23.	Control system	3.69	6
5.	Labor productivity and improvement	3.68	7
2.	Replace key personnel	3.62	8
11.	Owner absence from the company	3.62	8

21.	Commitment	3.58	10
17.	One man rule	3.54	11
18.	Inflation	3.54	11
7.	Company organization	3.52	13
6.	Use of project management techniques	3.43	14
3.	Assigning site engineer	3.38	15
10.	Internal company problems	3.35	16
22.	Competent consultation	3.34	17
20.	React to change	3.25	18
15.	Using of documentation system	3.25	18
13.	Frauds	3.18	20
19	Communication system	3.05	21
12.	Using computers applications	3.00	22
9.	Claims	2.8	23

4.2.2.2 Financial group

Mean of each of sub-factor of financial group is presented in Table 4.4 in a descending manner. Rank of each factor is also listed. Depending on banks and paying high profits and cash flow management had the highest means respectively. While benefits and compensations of employees had the lowest rank in the same group.

Table 4.4 Means and ranking of financial sub-factors

No	Sub-factor	Mean	Rank
13.	Depending on banks and paying high interests	4.32	1
2.	Cash flow management	4.26	2
10.	Lack of capital	4.26	3
1.	Low margin of profit due to competition	4.22	4
3.	Estimating practices	4.03	5
11.	Mistiming of capital expenditures	4.00	6
5.	Bill and collecting effectively	3.92	7
12.	Difference of local currency exchange with contract currency	3.75	8
7.	Evaluation of profit yearly	3.34	9
9.	Material wastages	3.32	10
6.	Controlling equipment cost and usage	3.29	11
4.	Dealing with variation order	3.26	12
8.	Employee benefits and compensation	2.77	13

4.2.2.3 Expansion group

There are 6 sub-factors under the expansion group outlined in table 4.5. ' Lack of managerial development as the company growth' and ' Increase size of projects' were ranked at the first and second positions with mean ranks of 3.98 and 3.62 respectively. At the middle 'change in type of work' and 'increase number of projects' were ranked in the therid and fourth positions three and four. Both 'Opening a regional office in other governorates' and 'Change work from private to public or vice versa' were ranked at position 5 and 6 with mean rank of 2.69 and 2.74 respectively.

Table 4.5 Means and ranking of expansion group sub-factors

No	Sub-factor	Mean	Rank
5.	Lack of managerial development as the company growth	3.98	1
3.	Increase size of projects	3.62	2
4.	Change in the type of work	3.58	3
2.	Increase number of projects	3.38	4
6.	Change work from private to public or vice versa	2.74	5
1.	Opening a regional office in other governorates	2.69	6

4.2.2.4 Environment group

There are 8 sub-factors listed under the environment group shown in table 4.6. The highest three causes are 'absence of construction regulations', ' award contracts to lowest price' National slumpin economy'. On the other hand, the lowest three causes are 'bad weather', 'insufficient award of contracts' and 'accounting and tax practices'.   'Owner involvement in construction phase' is at the middle.

Table 4.6 Means and ranking of environment sub-factors

No	Sub-factor	Mean	Rank
2.	Absence of construction regulations	4.22	1
3.	Award contracts to lowest price	4.15	2
1.	National slump in economy	4.02	3
4.	Absence of specialized courts	3.65	4
5.	Owner involvement in construction phase	3.28	5
7.	Accounting and tax practices	3.11	6
8.	Insufficient award of contracts	2.88	7
6.	Bad weather	2.22	8

4.2.2.5 Political group

Table 4.7 illustrates ranking of 9 sub-factors under political group. Most causes has been ranked with high means. The highest four mean ranks are: 'Delay in collecting dibs from donors clients', 'closure', 'segmentation of Gaza Strip' and 'high cost of materials' with mean ranks of 4.45, 4.37, 4.25 and 4.03 respectively. While the lowest three mean ranks are: 'dealing with suppliers and traders', 'banks policy' and 'monopoly' with mean ranks of 3.34, 3.65 and 3.74 respectively.

Table 4.7 Means and ranking of political sub-factors

No	Sub factor	Mean	Rank
9.	Delay in collecting dibs from donors	4.45	1
1.	Closure	4.37	2
2.	Segmentation of Gaza Strip	4.25	3
5.	High cost of materials	4.03	4
6.	Lack of resources	3.91	5
8.	Limitation on importing	3.82	6
4.	Monopoly	3.74	7
3.	Banks policy	3.65	8
7.	Dealing with suppliers and traders	3.34	9

4.2.2.6 Over-all ranks of all sub-factors causing failure

Table 4.8 outlines the factors affecting contractor's failure in descending manner. It indicates that the five sever factors are "delay in collecting dibs from clients, closure, banks policy, cash flow management, and lack of capital" with mean ranks 4.45, 4.37, 4.32, 4.26, and 4.26 respectively. All of these factors are related to political group or financial group. Although "delay in collecting dibs from donors, banks policy due to Intifada" are listed under political group, they are directly related to finance. It has been

noticed that the "bad weather, opening a regional office in other governorates, change work from private to public or vice versa, employee benefits and compensation, and claims" are the lowest five factors that causing contractor's failure with mean ranks 2.22, 2.69, 2.74, 2.77, 2.8 respectively.

Table 4.8 Overall means and ranks of all sub-factors

Sub factor	Mean	Rank
Delay in collecting dibs from donors	4.45	1
Closure	4.37	2
Depending on banks and paying high profits	4.32	3
Lack of capital	4.26	4
Cash flow management	4.26	4
Lack of experience in the line of work	4.25	5
Segmentation of Gaza Strip	4.25	5
Absence of construction regulations	4.22	6
Low margin of profit due to competition	4.22	6
Award contracts to lowest price	4.15	7
Lack of experience in contracts	4.15	7
Bad decisions in regulating company policy	4.03	8
High cost of materials	4.03	8
Estimating practices	4.03	8
National slump in economy	4.02	9
Mistiming of capital expenditures	4.00	10
Lack of managerial development as the company growth	3.98	11

Bill and collecting effectively	3.92	12
Lack of resources	3.91	13
Neglect	3.91	13
Limitation on importing	3.82	14
Difference of local currency exchange with contract currency	3.75	15
Procurement practices	3.75	15
Monopoly	3.74	16
Control system	3.69	17
Labor productivity and improvement	3.68	18
Company organization	3.68	18
Banks policy	3.65	19
Absence of specialized courts	3.65	19
Replace key personnel	3.62	20
Owner absence from the company	3.62	20
Increase size of projects	3.62	20
Commitment	3.58	21
Change in the type of work	3.58	21
One man rule	3.54	22
Inflation	3.54	22
Use of project management techniques	3.43	23
Assigning site engineer	3.38	24
Assigning site engineer	3.38	24
Internal company problems	3.35	25

Evaluation of profit yearly	3.34	26
Competent consultation	3.34	26
Dealing with suppliers and traders	3.34	26
Material wastages	3.32	27
Controlling equipment cost and usage	3.29	28
Owner involvement in construction phase	3.28	29
Dealing with variation order	3.26	30
React to change	3.25	31
Using of documentation system	3.25	31
Frauds	3.18	32
Communication system	3.05	33
Using computers applications	3.00	34
Insufficient award of contracts	2.88	35
Claims	2.8	36
Employee benefits and compensation	2.77	37
Change work from private to public or vice versa	2.74	38
Opening a regional office in other governorates	2.69	39
Bad weather	2.22	40

4.2.2.7 The highest ten causes of failure

The highest ten factors that cause contractor's failure and related group are illustrated in Table 4.9.

Table 4.9 The highest ten factors of failure

Sub-factor	Mean	Rank
Delay in collecting dibs from donors	4.45	1
Closure	4.37	2
Depending on banks and paying high profits	4.32	3
Lack of capital	4.26	4
Cash flow management	4.26	4
Lack of experience in the line of work	4.25	5
Segmentation of Gaza Strip	4.25	5
Absence of construction regulations	4.22	6
Low margin of profit due to competition	4.22	6
Award contracts to lowest price	4.15	7
Lack of experience in contracts	4.15	7

4.3 Relationship between population characteristics and main groups

The One-Way ANOVA procedure produces a one-way analysis of variance for a quantitative dependent variable by a single factor (independent) variable. Analysis of variance is used to test the hypothesis that several means are equal. This technique is an extension of the two-sample t test.

In addition to determining that differences exist among the means, you may want to know which means differ. There are two types of tests for comparing means: a priori contrasts and post hoc tests. Contrasts are tests set up before running the experiment and post hoc tests are run after the experiment has been conducted. You can also test for trends across categories.

Statistics for each group: number of cases, mean, standard deviation, standard error of the mean, minimum, maximum, and 95% confidence interval for the mean. Levene's test for homogeneity of variance, analysis-of-variance table for each dependent

variable, user-specified a priori contrasts, and post hoc range tests and multiple comparisons Bonferroni test.

4.3.1 Relationship between position and main groups

Table shows that there is no significant difference between those who filled the questionnaire and the results obtained since α is more than 0.05. In other words, despite who filled the questionnaire, the director, the vice director, the project manager, or the site or office engineer, the same point of view regarding the severity of causes of contractor's failure were resulted. The results show that we accept the null hypothesis that the means of all levels are equal, which means that there is no significant difference between the mean of the levels.

Table 4.10 One-way ANOVA (position and main groups)

		Sum of Squares	df	Mean Square	F	Sig.
MANGROUP	Between Groups	1.357	3	.452	1.101	.356
	Within Groups	25.059	61	.411		
	Total	26.415	64			
FINGROUP	Between Groups	.429	3	.143	.478	.699
	Within Groups	18.248	61	.299		
	Total	18.677	64			
EXPGROUP	Between Groups	.213	3	7.107E-02	.059	.981
	Within Groups	73.872	61	1.211		
	Total	74.085	64			
ENVGROUP	Between Groups	.371	3	.124	.315	.815
	Within Groups	23.977	61	.393		
	Total	24.348	64			
POLGROUP	Between Groups	2.033	3	.678	1.235	.305
	Within Groups	33.475	61	.549		
	Total	35.507	64			

4.3.2 Relationship between number of employees and main groups

Looking at the data in table, all values of α is more than 0.05. This indicates that despite the company size the results are the same.

Table 4.11 One-way ANOVA (number of employees and main groups)

		Sum of Squares	df	Mean Square	F	Sig.
MANGROUP	Between Groups	1.078	3	.359	.866	.464
	Within Groups	25.337	61	.415		
	Total	26.415	64			
FINGROUP	Between Groups	2.146	3	.715	2.640	.057
	Within Groups	16.530	61	.271		
	Total	18.677	64			
EXPGROUP	Between Groups	5.777	3	1.926	1.720	.172
	Within Groups	68.308	61	1.120		
	Total	74.085	64			
ENVGROUP	Between Groups	.928	3	.309	.806	.495
	Within Groups	23.419	61	.384		
	Total	24.348	64			
POLGROUP	Between Groups	.222	3	7.414E-02	.128	.943
	Within Groups	35.285	61	.578		
	Total	35.507	64			

4.3.3 Relationship between number of projects and main groups

No significant difference between the numbers of projects executed and the results obtained.

Table 4.12 One-way ANOVA (number of projects and main groups

		Sum of Squares	df	Mean Square	F	Sig.
MANGROUP	Between Groups	.435	4	.109	.251	.908
	Within Groups	25.980	60	.433		
	Total	26.415	64			
FINGROUP	Between Groups	1.021	4	.255	.868	.489
	Within Groups	17.656	60	.294		
	Total	18.677	64			
EXPGROUP	Between Groups	4.226	4	1.057	.907	.465
	Within Groups	69.859	60	1.164		
	Total	74.085	64			
ENVGROUP	Between Groups	.371	4	9.274E-02	.232	.919
	Within Groups	23.977	60	.400		
	Total	24.348	64			
POLGROUP	Between Groups	1.511	4	.378	.667	.618
	Within Groups	33.996	60	.567		
	Total	35.507	64			

4.3.4 Relationship between years of experience and main groups

No significant difference between the years of experience of the company and the results obtained.

Table 4.13 One-way ANOVA (years of experience and main groups)

		Sum of Squares	df	Mean Square	F	Sig.
MANGROUP	Between Groups	.326	3	.109	.254	.858
	Within Groups	26.089	61	.428		
	Total	26.415	64			
FINGROUP	Between Groups	.880	3	.293	1.006	.397
	Within Groups	17.797	61	.292		
	Total	18.677	64			
EXPGROUP	Between Groups	1.249	3	.416	.349	.790
	Within Groups	72.836	61	1.194		
	Total	74.085	64			
ENVGROUP	Between Groups	1.704	3	.568	1.531	.216
	Within Groups	22.643	61	.371		
	Total	24.348	64			
POLGROUP	Between Groups	2.373	3	.791	1.456	.235
	Within Groups	33.134	61	.543		
	Total	35.507	64			

4.3.5 Relationship between volume of work and main groups

No significant difference between the volume of work of the company and the results obtained.

Table 4.14 One-way ANOVA (volume of work and main groups)

		Sum of Squares	df	Mean Square	F	Sig.
MANGROUP	Between Groups	2.679	4	.670	1.693	.163
	Within Groups	23.737	60	.396		
	Total	26.415	64			
FINGROUP	Between Groups	2.402	4	.601	2.214	.078
	Within Groups	16.275	60	.271		
	Total	18.677	64			
EXPGROUP	Between Groups	4.379	4	1.095	.942	.446
	Within Groups	69.706	60	1.162		
	Total	74.085	64			
ENVGROUP	Between Groups	2.936	4	.734	2.057	.098
	Within Groups	21.412	60	.357		
	Total	24.348	64			
POLGROUP	Between Groups	1.952	4	.488	.873	.486
	Within Groups	33.555	60	.559		
	Total	35.507	64			

4.3.6 Relationship between company classification and main groups

Table shows that there is significant difference between company classification and the variable or causes of financial group since α is less than 0.05. Although, the value of α = 0.045 of managerial group which is less than 0.05, it is considered that there is no significant difference when the value is approximated to two digits. To determine which classes have significant difference, multiple comparison test is conducted as shown in section 4.5.

Table 4.15 One-way ANOVA (company classification and main groups)

		Sum of Squares	df	Mean Square	F	Sig.
MANGROUP	Between Groups	2.512	2	1.256	3.258	.045
	Within Groups	23.903	62	.386		
	Total	26.415	64			
FINGROUP	Between Groups	1.970	2	.985	3.656	.032
	Within Groups	16.707	62	.269		
	Total	18.677	64			
EXPGROUP	Between Groups	3.305	2	1.653	1.448	.243
	Within Groups	70.780	62	1.142		
	Total	74.085	64			
ENVGROUP	Between Groups	.291	2	.146	.375	.689
	Within Groups	24.056	62	.388		
	Total	24.348	64			
POLGROUP	Between Groups	2.071	2	1.036	1.920	.155
	Within Groups	33.436	62	.539		
	Total	35.507	64			

4.3.7 Relationship between company field of work and main groups

No significant difference between company field of work and the results obtained.

Table 4.16 One-way ANOVA (company field of work and main groups)

		Sum of Squares	df	Mean Square	F	Sig.
MANGROUP	Between Groups	.745	2	.372	.900	.412
	Within Groups	25.670	62	.414		
	Total	26.415	64			
FINGROUP	Between Groups	1.089	2	.544	1.919	.155
	Within Groups	17.588	62	.284		
	Total	18.677	64			
EXPGROUP	Between Groups	6.643E-02	2	3.322E-02	.028	.973
	Within Groups	74.019	62	1.194		
	Total	74.085	64			
ENVGROUP	Between Groups	1.342	2	.671	1.809	.172
	Within Groups	23.005	62	.371		
	Total	24.348	64			
POLGROUP	Between Groups	2.560	2	1.280	2.408	.098
	Within Groups	32.948	62	.531		
	Total	35.507	64			

4.3.8 Comparing variance of expansion group and environment group

Since expansion and environment groups have the same average mean, variance is calculated to determine the difference of the two groups.

Figure 4.9 Variance of expansion group
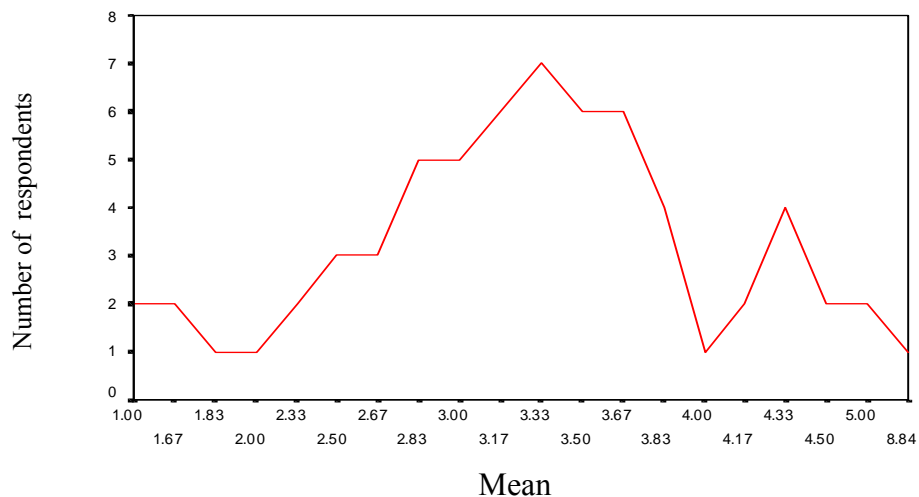
Figure 4.10 Variance of environment group
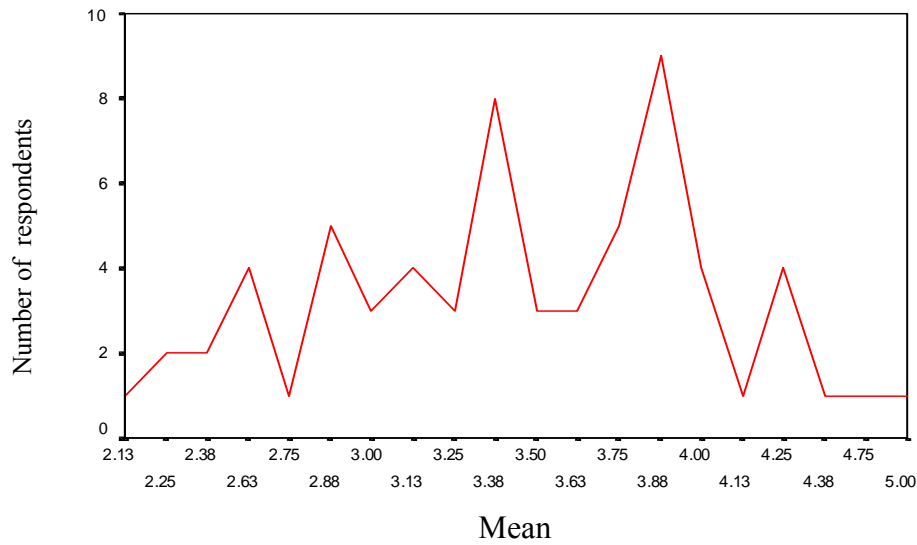
4.5 Multiple comparisons

From Table 4.17, one can conclude that the variance of the difference levels are equal from the homogeneity of variance test since significant difference is larger than α in all cases which is a necessary condition for using parametric tests.

Table 4.17 Test of homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
MANGROUP	.077	2	62	.926
FINGROUP	.400	2	62	.672
EXPGROUP	1.882	2	62	.161
ENVGROUP	.234	2	62	.792
POLGROUP	.267	2	62	.766

Table shows that there is at least significant difference between the mean of two of the financial group. Bonbferroni analysis indicates that the significant difference is between the first and second class. The mean of the answers of questions in financial group of second class contractors are better than the mean of the answers of the first class contractors because the mean difference between them is 0.3881.

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Table 4.18 ANOVA test for main groups

		Sum of Squares	df	Mean Square	F	Sig.
MANGROUP	Between Groups	2.512	2	1.256	3.258	.045
	Within Groups	23.903	62	.386		
	Total	26.415	64			
FINGROUP	Between Groups	1.970	2	.985	3.656	.032
	Within Groups	16.707	62	.269		
	Total	18.677	64			
EXPGROUP	Between Groups	3.305	2	1.653	1.448	.243
	Within Groups	70.780	62	1.142		
	Total	74.085	64			
ENVGROUP	Between Groups	.291	2	.146	.375	.689
	Within Groups	24.056	62	.388		
	Total	24.348	64			
POLGROUP	Between Groups	2.071	2	1.036	1.920	.155
	Within Groups	33.436	62	.539		
	Total	35.507	64			

Table 4.19 Multiple comparisons (Bonbferroni analysis)

Dependent Variable	(I) COMP_CLS	(J) COMP_CLS	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
MANGROUP	first class	second class	-.3794	.1723	.094	-.8035	4.462E-02
		third class	.1308	.2234	1.000	-.4189	.6804
	second class	first class	.3794	.1723	.094	-4.4616E-02	.8035
		third class	.5102	.2386	.109	-7.6836E-02	1.0972
	third class	first class	-.1308	.2234	1.000	-.6804	.4189
		second class	-.5102	.2386	.109	-1.0972	7.684E-02
FINGROUP	first class	second class	-.3881*	.1441	.027	-.7426	-3.3612E-02
		third class	-.1069	.1867	1.000	-.5664	.3526
	second class	first class	.3881*	.1441	.027	3.361E-02	.7426
		third class	.2812	.1994	.491	-.2095	.7720
	third class	first class	.1069	.1867	1.000	-.3526	.5664
		second class	-.2812	.1994	.491	-.7720	.2095
EXPGROUP	first class	second class	-.4922	.2965	.306	-1.2219	.2375
		third class	-5.0010E-02	.3844	1.000	-.9958	.8958
	second class	first class	.4922	.2965	.306	-.2375	1.2219
		third class	.4422	.4105	.857	-.5680	1.4523
	third class	first class	5.001E-02	.3844	1.000	-.8958	.9958
		second class	-.4422	.4105	.857	-1.4523	.5680
ENVGROUP	first class	second class	-.1250	.1729	1.000	-.5504	.3004
		third class	-.1500	.2241	1.000	-.7014	.4014
	second class	first class	.1250	.1729	1.000	-.3004	.5504
		third class	-2.5000E-02	.2393	1.000	-.6139	.5639
	third class	first class	.1500	.2241	1.000	-.4014	.7014
		second class	2.500E-02	.2393	1.000	-.5639	.6139
POLGROUP	first class	second class	-.3195	.2038	.366	-.8210	.1821
		third class	-.4190	.2642	.354	-1.0690	.2311
	second class	first class	.3195	.2038	.366	-.1821	.8210
		third class	-9.9470E-02	.2822	1.000	-.7938	.5948
	third class	first class	.4190	.2642	.354	-.2311	1.0690
		second class	9.947E-02	.2822	1.000	-.5948	.7938

*. The mean difference is significant at the .05 level.

4.4 Partial correlation coefficients

Partial correlation coefficient test was conducted between groups to determine the relationship between one group to others. The value or r is between zero and one when r> 0-0.5 a weak positive relationship between groups is found. When r> 0.5-1 a strong positive relationship is found. When r> -0.5-0.0 weak inverse relationship is found and when r> -0.5-(-1) a strong inverse relationship is found.

4.4.1 Partial correlation coefficients (position and main groups)

```
Controlling for POSITON

            MANGROUP   FINGROUP   EXPGROUP   ENVGROUP   POLGROUP

MANGROUP     1.0000       .7160      .4413      .3845      .4145
            (     0)    (    62)   (    62)   (    62)   (    62)
            P= .        P= .000    P= .000    P= .002    P= .001


FINGROUP      .7160     1.0000      .4220      .6165      .5021
            (    62)   (     0)   (    62)   (    62)   (    62)
            P= .000     P= .       P= .001    P= .000    P= .000


EXPGROUP      .4413       .4220    1.0000      .2974      .2139
            (    62)   (    62)   (     0)   (    62)   (    62)
            P= .000     P= .001    P= .       P= .017    P= .090


ENVGROUP      .3845       .6165      .2974    1.0000      .6381
            (    62)   (    62)   (    62)   (     0)   (    62)
            P= .002     P= .000    P= .017    P= .       P= .000


POLGROUP      .4145       .5021      .2139      .6381    1.0000
            (    62)   (    62)   (    62)   (    62)   (     0)
            P= .001     P= .000    P= .090    P= .000    P= .


(Coefficient / (D.F.) / 2-tailed Significance)


" . " is printed if a coefficient cannot be computed
```

4.4.2 Partial correlation coefficients (number of labors and main groups)

```
Controlling for number of employees


            MANGROUP    FINGROUP    EXPGROUP    ENVGROUP    POLGROUP


MANGROUP     1.0000       .7322       .4377       .3910       .4124
            (     0)    (    62)    (    62)    (    62)    (    62)
            P= .        P= .000     P= .000     P= .001     P= .001


FINGROUP      .7322      1.0000       .3832       .6295       .5144
            (    62)    (     0)    (    62)    (    62)    (    62)
            P= .000     P= .        P= .002     P= .000     P= .000


EXPGROUP      .4377       .3832      1.0000       .2957       .2175
            (    62)    (    62)    (     0)    (    62)    (    62)
            P= .000     P= .002     P= .        P= .018     P= .084


ENVGROUP      .3910       .6295       .2957      1.0000       .6379
            (    62)    (    62)    (    62)    (     0)    (    62)
            P= .001     P= .000     P= .018     P= .        P= .000


POLGROUP      .4124       .5144       .2175       .6379      1.0000
            (    62)    (    62)    (    62)    (    62)    (     0)
            P= .001     P= .000     P= .084     P= .000     P= .


(Coefficient / (D.F.) / 2-tailed Significance)


" . " is printed if a coefficient cannot be computed
```

4.4.3 Partial correlation coefficients (number of projects and main groups)

```
Controlling for number of number of projects executed


            MANGROUP   FINGROUP   EXPGROUP   ENVGROUP   POLGROUP


MANGROUP     1.0000      .7236      .4327      .3916      .4161
            (    0)    (   62)    (   62)    (   62)    (   62)
            P= .       P= .000    P= .000    P= .001    P= .001


FINGROUP      .7236     1.0000      .4048      .6267      .5186
            (   62)    (    0)    (   62)    (   62)    (   62)
            P= .000    P= .       P= .001    P= .000    P= .000


EXPGROUP      .4327      .4048     1.0000      .2967      .2222
            (   62)    (   62)    (    0)    (   62)    (   62)
            P= .000    P= .001    P= .       P= .017    P= .078


ENVGROUP      .3916      .6267      .2967     1.0000      .6396
            (   62)    (   62)    (   62)    (    0)    (   62)
            P= .001    P= .000    P= .017    P= .       P= .000


POLGROUP      .4161      .5186      .2222      .6396     1.0000
            (   62)    (   62)    (   62)    (   62)    (    0)
            P= .001    P= .000    P= .078    P= .000    P= .


(Coefficient / (D.F.) / 2-tailed Significance)


" . " is printed if a coefficient cannot be computed
```

4.4.4 Partial correlation coefficients (years of experience and main groups)

```
Controlling for years of experience


             MANGROUP   FINGROUP   EXPGROUP   ENVGROUP   POLGROUP


MANGROUP      1.0000      .7226      .4361      .3931      .4124
             (    0)    (   62)    (   62)    (   62)    (   62)
             P= .      P= .000    P= .000    P= .001    P= .001


FINGROUP       .7226    1.0000      .4209      .6259      .5034
             (   62)    (    0)    (   62)    (   62)    (   62)
             P= .000    P= .      P= .001    P= .000    P= .000


EXPGROUP       .4361      .4209    1.0000      .2977      .2140
             (   62)    (   62)    (    0)    (   62)    (   62)
             P= .000    P= .001    P= .      P= .017    P= .089


ENVGROUP       .3931      .6259      .2977    1.0000      .6381
             (   62)    (   62)    (   62)    (    0)    (   62)
             P= .001    P= .000    P= .017    P= .      P= .000


POLGROUP       .4124      .5034      .2140      .6381    1.0000
             (   62)    (   62)    (   62)    (   62)    (    0)
             P= .001    P= .000    P= .089    P= .000    P= .


(Coefficient / (D.F.) / 2-tailed Significance)


" . " is printed if a coefficient cannot be computed
```

4.4.5 Partial correlation coefficients (volume of work and main groups)

```
Controlling for volume of work


            MANGROUP   FINGROUP   EXPGROUP   ENVGROUP   POLGROUP


MANGROUP     1.0000       .7295      .4453      .3905      .4062
           (    0)      (   62)    (   62)    (   62)    (   62)
           P= .         P= .000    P= .000    P= .001    P= .001


FINGROUP      .7295     1.0000       .4179      .6242      .5154
           (   62)      (    0)    (   62)    (   62)    (   62)
           P= .000     P= .         P= .001    P= .000    P= .000


EXPGROUP      .4453       .4179     1.0000       .3015      .2273
           (   62)      (   62)    (    0)    (   62)    (   62)
           P= .000     P= .001     P= .         P= .015    P= .071


ENVGROUP      .3905       .6242      .3015     1.0000       .6387
           (   62)      (   62)    (   62)    (    0)    (   62)
           P= .001     P= .000     P= .015    P= .         P= .000


POLGROUP      .4062       .5154      .2273      .6387     1.0000
           (   62)      (   62)    (   62)    (   62)    (    0)
           P= .001     P= .000     P= .071    P= .000    P= .


(Coefficient / (D.F.) / 2-tailed Significance)


" . " is printed if a coefficient cannot be computed
```

4.4.6 Partial correlation coefficients (company classification and main groups)

```
Controlling for company classification


          MANGROUP   FINGROUP   EXPGROUP   ENVGROUP   POLGROUP


MANGROUP    1.0000      .7260      .4350      .3908      .4154
          (     0)   (    62)   (    62)   (    62)   (    62)
          P= .        P= .000    P= .000    P= .001    P= .001


FINGROUP     .7260     1.0000      .4128      .6149      .4813
          (    62)   (     0)   (    62)   (    62)   (    62)
          P= .000     P= .       P= .001    P= .000    P= .000


EXPGROUP     .4350      .4128     1.0000      .2909      .1999
          (    62)   (    62)   (     0)   (    62)   (    62)
          P= .000    P= .001     P= .       P= .020    P= .113


ENVGROUP     .3908      .6149      .2909     1.0000      .6345
          (    62)   (    62)   (    62)   (     0)   (    62)
          P= .001    P= .000    P= .020     P= .       P= .000


POLGROUP     .4154      .4813      .1999      .6345     1.0000
          (    62)   (    62)   (    62)   (    62)   (     0)
          P= .001    P= .000    P= .113    P= .000     P= .


(Coefficient / (D.F.) / 2-tailed Significance)


" . " is printed if a coefficient cannot be computed
```

4.4.7 Partial correlation coefficients (company major and main groups)

```
Controlling for company field of work


          MANGROUP   FINGROUP   EXPGROUP   ENVGROUP   POLGROUP


MANGROUP    1.0000       .7229      .4362      .3985      .4311
          (     0)   (    62)   (    62)   (    62)   (    62)
          P= .       P= .000    P= .000    P= .001    P= .000


FINGROUP      .7229    1.0000       .4228      .6194      .5049
          (    62)   (     0)   (    62)   (    62)   (    62)
          P= .000    P= .       P= .001    P= .000    P= .000


EXPGROUP      .4362      .4228    1.0000       .3049      .2298
          (    62)   (    62)   (     0)   (    62)   (    62)
          P= .000    P= .001    P= .       P= .014    P= .068


ENVGROUP      .3985      .6194      .3049    1.0000       .6276
          (    62)   (    62)   (    62)   (     0)   (    62)
          P= .001    P= .000    P= .014    P= .       P= .000


POLGROUP      .4311      .5049      .2298      .6276    1.0000
          (    62)   (    62)   (    62)   (    62)   (     0)
          P= .000    P= .000    P= .068    P= .000    P= .


(Coefficient / (D.F.) / 2-tailed Significance)


" . " is printed if a coefficient cannot be computed
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Chapter 5

Discussion

This study is to determine the causes of contractor's failure in Gaza Strip. Then, determine the severity of each factor from the contactor's point of view. In this chapter the results and findings of this research are discussed in detail and compared with the results and findings of available similar studies.

5.1 Sample size characteristics

The sample size of this research was selected randomly to represent the study population of first, second and third class categories of contracting companies who had valid registration in Gaza Contracting Union. This sample size was calculated using Creative Research Systems (2001). The results showed that the sample size is consisting of 52.3% first class contractors, 32.3% second class contractors, while only 15.4% of them are of third class. This distribution indicates that the requirement of classification system which leads the class A dominates is so easy and more regulations to be done to normally distribute contractors among the first three categories. The sample size selected was 75 contracting companies which is considered sufficient and meets the statistical requirements of Hoog and Tannis (1997) and also meets with what has been written by Grove and Burns (1993) that the sample size should contain at least 30 subjects. The number of respondents was 65 companies out of 75 which represent approximately 86.67 %. This rate is considered high compared with the norm of 60-70% of most structured interview questionnaire in construction industry as outlined by Naoum (1998). This also reflects the high importance given by contracting companies to this subject which directly affect not only their work but also their existence.

The results showed that 41 contractors (63.1%) field of work was in construction. While only 7 companies (10.8%) line of work was infrastructure. This is because construction works do not require heavy machines and equipments. Also, construction works in Gaza Strip depend mainly on sub-contractors.

The results show that only 17 contracting companies (26.2%) were established before the existence of Palestinian National Authority PNA in 1994. While the remaining 48 (74.8%) companies were established later on. The sample of this study has better distribution than the sample considered by Madi (2003) since only (11.5%) of companies was established after the PNA existence.

This indicates that the most contracting companies in Gaza Strip are newly established and as they have less than 10 years of experience in the line of work. More details about years of experience were shown in Figure 4.6. The Figure shows that (18.5%) of companies had experience less than 3 years. 32.3% of companies had experience of 5 to 10 years. While 49.2% had experience in the line of work more than 10 years. This contradiction between the year of establishment and the years of experience could be understood as some companies executed work before their official existence. Comparing results with Type 1 failures discussed in literature review that shows that over 50 per cent and perhaps as many as 60 per cent of all failures are of this type. Type 1 failure occurs to companies of maximum 8 years of experience. This explains the high rate of contractor's failure in the Gaza Strip.

The results showed that there is no significant difference due to year of establishment of a firm in relation to the causes of failure from contractor's point of view. This implies that the contractors do not have benefits from the long period of experience in their line of work.

It has been found that the majority of contracting companies (89.2%) have small number of staff members of less than 14 employees. While only 7 companies (18.8%) have more than 14 employees. This result is supported by the Federation of Palestinian Chambers that 82% of construction firms are of small size with less than 10 employees. This indicates that contracting companies have simple organizations and could be considered small size firms according to the definition of small size enterprises shown in Table 5.1. Also no significant difference referred to size of company staff members and the contractor's point of view regarding to the severity of causes of contractor's failure.

Table 5.1 number of employees as a criterion for the definition of small enterprises

country	Number of employees
Greece	9
Turkey	10
Kuwait	10
Iraq	10
Norway	19
Egypt	35
Jordan	35
Morocco	49
Saudi Arabia	49
Brazil	100
India	100
ILO	49
Malaysia	49
Australia	20
Occupation of Israel	Less than 70

Results showed that 24 companies (58.5%) had executed less than 20 projects during the last five years with an average of 4 projects per year. only 5 companies (7.7%) of companies have executed more than 40 projects with an average of 8 projects per year. Moreover, 89.2% of contracting companies have executed projects with value less than five million dollars during the last five years. It indicates that the average workload equals 1 million dollars per year which considered very small compared with other studies.

The results showed that there is no significant difference due to the number of projects executed or the volume of work in relation to the causes of failure. This may be

explained by that the execution of more projects give no real experience to contractors and that they did not improve their managerial and financial capabilities with time.

The work force of 44 companies (67.7%) of companies was less than 50 labors. Only 2 companies (3.1%) had a work force of more than 250 labors. It is another evidence that the majority of firms in Gaza Strip are of small size.

5.2 Causes of failure

This study has been conducted to determine the severity of 53 factors that cause failure to contractors in the Gaza Strip. The causes have been selected by a careful review of the literature review and previous studies of the same or similar subject. Many causes were listed after pilot study was conducted to coincide with the local market.

The 53 sub-factors were divided into five major groups as follows:

- Managerial group
- Financial group
- Expansion group
- Environment group
- Political group

Political factors usually listed under the environment group. Here, these causes were separated to give the special case that Palestinians live in the Gaza strip and the West Bank (GSWB) under occupation. Political causes may directly affect the contractor's failure such as closure and segmentation of Gaza Strip or indirectly affect failure such as bank's policy and dealing with suppliers.

5.2.1 Managerial group

The results showed that the mean of managerial sub-factors group was 3.5262. While the mean of overall sub-factors group was 3.6212. The Managerial sub-factors that had means more than the average mean of overall sub-factors were:

- Lack of experience in the line of work
- Lack of experience in contracts
- Bad decisions in regulating company policy

- Neglect

- Procurement practices

- Control system

- Labor productivity and improvement

The previous sub-factors are considered the most important causes under the managerial group. This result was supported by the results of Arditi, Koksal, and Kale (2000) in their study that the organizational (managerial) factors represent only 17.14% of business factors.

All contractors had the same trend towards the managerial sub-factors and no significant difference had been appeared in results.

It seemed from results that the lowest managerial sub-factors were:

- Claims

- Using computers application

- Communication system

- Fraud

- Using documentation system

The argument regarding that the causes above are directly related to company size. When the company is small of size, its need to claims, computer applications, communication system, and using documentation system will be much lower than large companies. Also, the direct and close control minimizes fraud in such firms.

5.2.2 Financial group

The results illustrated that the mean of financial group 3.752 which is higher than the mean of overall causes of failure (3.6212). The results demonstrated that the following financial causes had means over the average mean of overall sub-factors:

- Depending on banks ad paying high profits

- Cash flow management

- Lack of capital

- Estimating practices

- Mistiming of capital expenditure

- Bill and collecting effectively

- Different of local currency exchange with contract currency

This was supported by many studies. The study of Arditi, Koksal, and Kale (2000) gives the financial factors weight of 56.82% of construction business failure. They concluded that over 80% of the failures were caused by five factors, namely 'insufficient profits' (26.71%), 'industry weakness' (22.73%), 'heavy operating expenses' (17.8%), 'insufficient capital' (8.29%), and 'burdensome institutional debt' (5.93%). All of these factors, except 'industry weakness', are financial factors.

Results showed that the following financial causes had the lowest means:

- Employee's benefits and compensations

- Dealing with variation orders

- Controlling equipment cost and usage

- Material wastages

- Evaluation of profit yearly

These causes related to organizational behavior. According to Argenti (1976), small firms don't pay as much attention to financial ratios as do larger firms. Small firms has not an accounting department that publishes reports on a regular basis and therefore, financial ratios are difficult to monitor since they hire private accountants. Gaza strip small firms never put into consideration the employee's benefits and compensations, variation orders, controlling equipment cost and usage, material wastages and yearly evaluating profits as a priority which may affect the financial situation of the company.

5.2.3 Expansion group

Only 6 factors were listed under expansion group. The average mean of these factors was found to be 3.4385 compared with the overall sub-factors average mean of 3.6212. Only two factors had means over or equal to the mean of overall sub-factors. They are:

- Lack of managerial development as the company grow

- Increase size of projects

The first factor under expansion group with mean equal to 3.98 is related to the capability of the company to adjust itself when it must do. It is directly related to managerial development while company under expansion. In the study of Arditi, Koksal, and Kale (2000), over expansion factor causing construction business failure had a weighted average occurrence value of only 0.15% of the total failure factors. A number of writers and experts mentioned that the increase of the size of projects as a potent cause of collapse. There seems to be wide agreement that one of the almost tediously repetitive mistake that lead to failure is the big project where costs and times are underestimated or revenues overestimated. In Gaza Strip, most projects are considered small in size.

Opening a regional office in other governorates had the lowest rank since the Gaza strip is small enough to be considered as one governorate. Also a few companies open a regional office in the WB. All other causes had a relatively small means as shown in chapter 4. Over expansion can drive a company to higher risk-investment with financial debt, hence increasing its chances of failure. Construction contractors must avoid the increase of the number of projects that the company cannot afford both organizationally and financially. Over expansion may mean that the company is employing too many employees and owns too much equipment, none of which the company is capable of financing.

5.2.4 Environment group

There are 8 sub-factors listed under the environment group. These factors are:

- National slump in economy
- Absence of construction regulations
- Award contract to lowest price
- Absence of specialized courts
- Owner involvement in construction phase
- Bad weather
- Accounting and tax practices

- Insufficient award of contracts

The average mean of the above sub-factors are 3.4385 which is less than the average mean of overall sub-factors. The environment sub-factors that have means higher than the average overall mean are:

- Absence of construction regulations

- Award contract to lowest price

- National slump in economy

- Absence of specialized courts

While the other sub-factors had relatively low means. The environment study of Arditi, Koksal, and Kale had given the environment factors 20.01% of all factors causing failure. One of the reasons that the ranks of the environment sub-factors in this study are relatively low is because the political sub-factors which had the highest average mean were sent into separate group.

The fact that the environment and the expansion groups had equaled means is a common case in statistics. When means are equal, the best comparison of two sets of data is the variance. The variance of the expansion group is shown in Figure 5.1 and the variance of the environment group is shown in Figure 5.2.

Figure 5.1 variance of expansion group
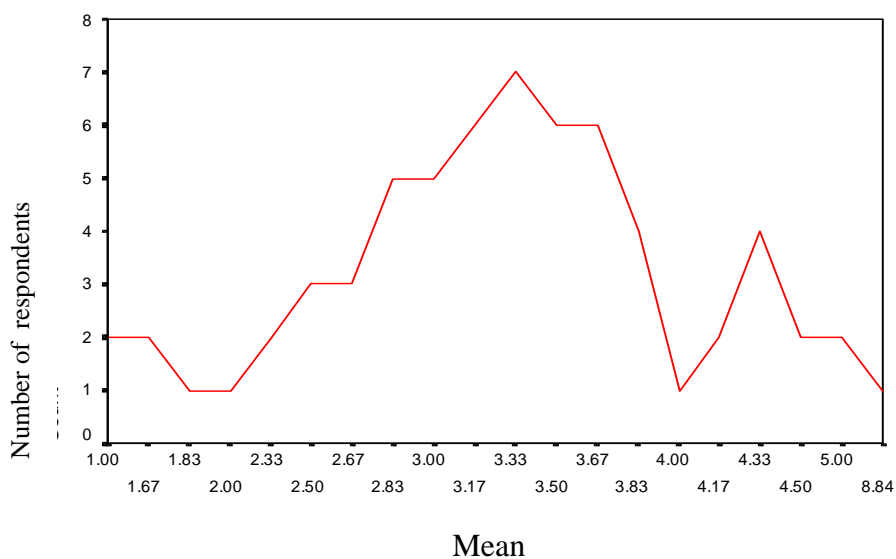
Figure 5.2 variance of environment group
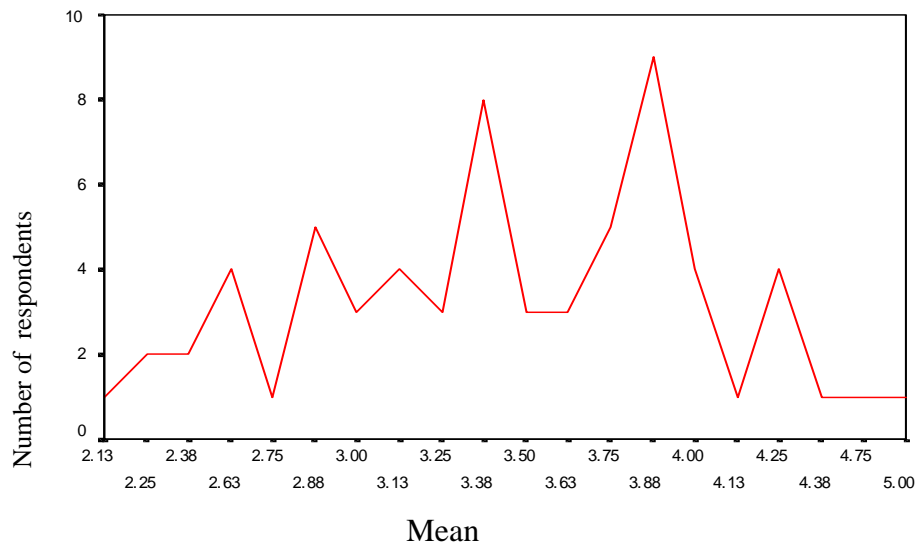
From Figure 5.1 and Figure5.2, the variance of the environment group shows that data of environment group has better distribution than the data of expansion group.

5.2.5 Political group

There are 9 sub-factors listed under the political group with average mean of 3.9487.Eight out of nine of political group sub-factors have means higher than the average mean of the overall sub-factors. These sub-factors are listed below:

- Delay in collecting debts from donors
- Closure
- Segmentation of Gaza Strip
- High cost of materials
- Lack of resources
- Limitations on importing
- Monopoly
- Banks policy

The above factors were rated according to their severity as causes of construction business failure. It has been noted that all political sub-factors except 'dealing with suppliers and traders' have been rated with high mean ranks of 4.45, 4.37, 4.25, 4.03, 3.91, 3.82, 3.74, and 3.65 respectively.

Most of projects in PNA are funded by donors. During Al-aqsa Intifada, construction companies have traditionally complained delay in collecting debts from donors as a direct impact of local business political environment. This cause is also directly related to cash flow management. With lack of capital and lack of financial resources, delay of collecting debts from donors makes the negative effect much worse. Closure has a mean of 4.37. The direct impact of external closure is a large reduction in labor income and serious disruptions to the flow of imports and exports. The internal closure introduces further disruptions to movements of both labor and goods. Closure do has adverse impact on Palestinian economy through a drop in productivity, income, introducing a more strict policies and regulations of Banks and suppliers, and monopoly as a result of lack in resources. Segmentation of Gaza Strip means dividing the Gaza Strip into two or sometimes three parts, which limits or prevents totally the movement manpower, goods and services. Segmentation has a very bad impact in work activities due to shortage of workforce and construction materials. High costs of materials, lack of resources, limitations on importing, monopoly and banks policy are a result of closure and segmentation of the Gaza Strip.

The results showed that the political sub-factors to be the most sever causes of contract's failure in Gaza Strip. This is justified because the study was conducted during the continued Intifada which followed 28, September 2000.

5.2.6 Overall ranks of all sub-factors

Table 5.2 Ranks of highest ten causes and related groups

Sub-factor	Main group	Mean	Rank
Delay in collecting dibs from donors	Political group	4.45	1
Closure	Political group	4.37	2
Depending on banks and paying high interest.	Financial group	4.32	3
Lack of capital	Financial group	4.26	4
Cash flow management	Financial group	4.26	4
Lack of experience in the line of work	Managerial group	4.25	5

Segmentation of Gaza Strip	Political group	4.25	5
Absence of construction regulations	Environment group	4.22	6
Low margin of profit due to competition	Financial group	4.22	6
Award contracts to lowest price	Environment group	4.15	7
Lack of experience in contracts	Managerial group	4.15	7

The results show that the ranks of the highest ten factors that cause failure are related mainly to political, financial and managerial groups as illustrated in Table 5.2. Using the analysis of variance ANOVA for each factor with the position of the person who filled the questionnaire, number of employees, number of projects executed during the last five years, years of experience, the volume of work of the company during the last 5 years, company classification and company field of wok, there were no statistically significance differenced in the opinion of respondents contracting companies except classification of company with financial group. The Results showed that there is no statistically significant difference in the contractor's point of view of regarding the severity of causes except the company classification with financial group. Significant value is $0.032 < 0.05$.

Multiple comparison test was conducted to determine which classes have significant difference. Benforni Analysis indicating that the significant difference is between the first and second class. It indicates that the answers of the second class are better than the first one because the mean difference between them is 0.3881.

The argument of this result is that the contracting companies do not make use of years of experience.

As a final comment, we accept the mull hypothesis which say that the means of all the levels are equal $H_0=0$ which means that there are no significant difference between the mean of the levels.

- Partial correlation coefficient test was conducted between groups. The value or r is between zero and one when r$>$ 0-0.5 a weak positive relationship between

groups is found. When r> 0.5-1 a strong positive relationship is found. When r>
-0.5-0.0 weak inverse relationship is found and when r> -0.5-(-1) a strong
inverse relationship is found. Results from Partial Correlation coefficients for
population characteristics (position, number of employees, number of executed
projects, years of experience, volume of work, and company major and
classification) showed that there is a strong positive relationship between:

- Managerial and financial groups.

- Financial and environment groups.

- Financial and political groups.

- Environment and political groups.

Chapter 6

Conclusion and Recommendations

This chapter includes the conclusions of the study, practical recommendations that may prevent or even reduce construction business failure, and proposed additional studies in the subject.

The main objective of this study is to determine the factors that cause failure to contractors in Gaza Strip. Then, determine the severity of each cause from the contractor's opinion.

6.1 Conclusion

50.8% of contracting companies have less than 8 years of experience. This may give an indication that the rate of failure in the coming years will be high since studies showed that 50-60% of failures was for companies of age less than 8 years.

The majority of contracting companies in Gaza Strip are small in size that there will be one-man rule for the simple reason that, in most cases, the company may only have one manager at that early stage of existence and there will also be a lack of managerial depth.

The construction industry has characteristics that sharply distinguish it from other sectors of the economy. It is fragmented, very sensitive to economic cycles, and highly competitive because of the large number of firms and relative ease of entry. It is basically due to these unique characteristics that the rate of construction business failure has become very high.

In this study, understanding the mechanism of failure is based on collecting information about the causes of business failures and then corrective actions may be done to prevent or reverse the a company's collapse. Identification of the severity of causes of failure was a major result of this research.

The focal point of this research is to explore the causes of contractor's failure in Gaza Strip. Contractors ranked:

- Delay in collecting dibs from donors.

- Closure.

- Depending on banks and paying high.

- Lack of capital.

- Lack of experience in the line of work.

- Cash flow management.

- Segmentation of Gaza Strip.

- Low margin of profit due to competition.

- Lack of experience in contracts.

- Award contracts to lowest price.

 As the highly influence factors that cause contractor's failure.

- Managerial and Financial.

- Financial and Expansion Environment and Political.

- Expansion and Environment, Political.

- Environment and Political.

The results showed that there were no differences of opinion of contractors, at the 5% significance level on almost all causes that lead to contractor's failure. The only exception was the company classification which only financial group. It was found that the significant deference was between class one and class two contractors.

Furthermore, the 53 sub-factors considered in this study were listed under 5 main groups, which are ranked according to their severity of causing failure as follows: political group, financial group, managerial group, environment, and expansion groups.

Five out of ten the highest causes are listed under the financial group, while 3 of them are listed under the political group.

The Findings obtained from partial correlation test between groups that these is a strong positive relationship between:

- Managerial and Financial groups

- Financial and expansion and Environment political.

- Political and financial and expansion, environment.
- Expansion with environment.

The positive relation between groups means that when increasing the mean of one group the mean of the other will increase also.

6.2 Recommendations

The basis of this recommendations is *'curing is better than prevention'*

6.2.1 Recommendations to PNA

1. The PNA must take the risk when the Donors delay the dibs of the contractors since most contracting companies in Gaza Strip are small in size with lack of capital.

2. The PNA must modify and improve the regulations and laws to meet the impact of closure and segmentation of Gaza Strip. These regulations are supposed to make companies make profits.

3. The PNA is recommended to connect the contract price with index.

4. The PNA should introduce coherent polices towards groups of suffered people injured by failure.

5. The PNA should conduct continuous training programs with co-operation with PCU and the Islamic University to improve managerial and financial practices to explain the internal and external factors affecting the construction industry.

6- Tenders must be awarded to accurate estimated cost and not necessarily to the lowest bidder.

6.2.2 Recommendations to the contractors

1- The contractors are asked to avoid bank loans that make the company to think it has a good cash flow management.

2- Top management must positively react to political and environmental change by means of managerial and financial policies.

3- The contracting companies should not increase the number of projects that cannot be controlled.

4- The contractors should avoid the increased volume of project (big project).

5- Company top management must not be with same knowledge and experience.

6- Contracting company must calculate and consider political and environmental risks in costing and estimating contracts.

6.3 Proposed further studies

1- This study was conducted during the ongoing Aqsa Intifada. It is better to repeat this study in usual environment to compare to what extent the impact of Intifada has on contractors.

2- It is necessary to repeat this research every 5 years to observe the new trends of contractors.

3- Researches about the technology of failure prediction and administrative mechanism for applying this technology to contractors in Gaza Strip are needed.

4- There is a need to model and modeling applications of the causes of failure that help in failure prediction like the Z model.

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List of Annexes

الجامعة الإسلامية – غـزة
كلية الهندسـة ـ قسم الهندسـة المدنية

استبانة حول
أسباب فشل المقاولين في قطاع غزة

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

الباحث : م. خالد عبد الرؤوف الحلاق
المشرف : الأستاذ الدكتور عدنان انشاصي

شعبان 1423 هـ / تشرين الأول – أكتوبر 2002 م

عزيزي المقاول / ـــــــــــــــــــــــــــــــــــ

السلام عليكم ورحمة الله وبركاته

تعتبر هذه الاستبانة جزءاً من البحث التكميلي لنيل درجة الماجستير في إدارة المشروعات الهندسية ، حيث يهدف هذا البحث إلى دراسة وتحليل الأسباب التي تؤدي إلي فشل وانهيار شركات المقاولات في قطاع غزة ، آملين أن يتمخض عن هذه الدراسة تقليل ظاهرة الفشل والابتعاد عن مسبباته.

وتتكون هذه الاستبانة من الأجزاء التالية :

1. السيرة الذاتية للشركة.

2. أسباب فشل المقاولين وتنقسم إلي :

   - أسباب إدارية.
   - أسباب مالية.
   - أسباب توسعية.
   - أسباب بيئية.
   - أسباب سياسية.

إن المعلومات الواردة في هذه الاستبانة سوف تستخدم لهذا البحث ، ولن تستخدم لأي أغراض أخري.

شاكرين لكم حسن تعاونكم ،،،

الباحث

م . خالد عبد الرؤوف الحلاق

الجزء الأول : السيرة الذاتية للشركة

1- سنة التأسيس _____

2- المركز الإداري لمن يقوم بتعبئة الإستبانة :

☐ مدير ☐ نائب مدير

☐ مدير مشروع ☐ مهندس موقع / مكتب

3- عدد الموظفين في الشركة _____

فنيين _____ اداريين _____

4- عدد العمالة في الشركة :

☐ أقل من 50 عامل ☐ من 50 إلى أقل من 100 عامل

☐ من 100 إلى 250 عامل ☐ أكثر من 250 عامل

5- عدد المشاريع المنفذة خلال السنوات الخمس الماضية :

☐ أقل من 10 مشاريع ☐ من 11 إلى 20 مشروع

☐ من 21 إلى 30 مشروع ☐ من 31 إلى 40 مشروع

☐ أكثر من 40 مشروع

6- عدد سنوات الخبرة في مجال المقاولات :

☐ أقل من سنة ☐ من سنة إلي ثلاث سنوات

☐ أكثر من ثلاث سنوات إلي خمس سنوات ☐ أكثر من خمس سنوات إلى عشر سنوات

☐ أكثر من عشر سنوات

7- حجم العمل بالدولار خلال السنوات الخمس الماضية :

☐ أكثر من 10 مليون دولار ☐ من 5 إلى 10 مليون دولار

☐ من 1 إلى أقل من 5 مليون دولار ☐ من 500,000 إلى أقل من مليون دولار

☐ أقل من 500,000 دولار

8- تصنيف الشركة حسب تصنيف لجنة التصنيف الوطنية :

تخصص / الدرجة	أبنية	طرق	مياه ومجاري	كهروميكانيك	صيانة
درجة أولي " أ "					
درجة أولي "ب"					
ثانية					
ثالثة					

الجزء الثاني : أسباب فشل المقاولين

يرجى تحديد درجة تأثير الأسباب التالية على فشل المقاولين وفقاً للرموز المدونة أدناه :

الرمز	درجة التأثير
1	مؤثر بدرجة قليلة جداً
2	مؤثر بدرجة قليلة
3	مؤثر بدرجة متوسطة
4	مؤثر بدرجة كبيرة
5	مؤثر بدرجة كبيرة جداً

5	4	3	2	1	أسباب إدارية	i.
					الخبرة في مجال العمل	1
					استبدال الإداريين الناجحين	2
					تعيين مهندس موقع	3
					القرارات الخاطئة في تنظيم سياسة الشركة	4
					إنتاجية العمال وتطويرها	5
					استخدام تقنية إدارة المشاريع	6
					هيكلية الشركة وتنظيمها	7
					إدارة توريد المواد	8
					الشكاوى ضد الشركة	9
					مشاكل الشركة الداخلية	10
					غياب صاحب الشركة عنها	11
					استخدام تطبيقات الكمبيوتر	12
					السرقات	13
					الإهمال	14
					استخدام نظام توثيق	15
					الخبرة في فهم العقود وشروطها	16
					الإدارة الفردية (مركزية الإدارة)	17
					التضخم الوظيفي لدي الشركة	18
					نظام الاتصالات	19
					قدرة التكيف مع التغيير	20
					الالتزام (مستوى الحماس، الإثارة، ال حافز لطاقم الإدارة،)	21
					عدم الحصول على استشارات المختصين (محاسبين، محامين ، بنكيين ، ....)	22
					نظام المراقبة و التحكم	23

5	4	3	2	1	أسباب مالية	ii.
					تدني الربح بسبب المنافسة	1
					إدارة السيولة النقدية	2
					تقنية تسعير العطاءات	3
					التعامل مع الأوامر التغييرية	4
					استرداد المبالغ بسرعة وفاعلية	5
					التحكم في قيمة واستخدام المعدات	6
					تقييم ربح المشاريع في سنة مالية	7
					حقوق وتعويضات الموظفين	8
					فاقد المواد	9
					رأس المال غير كافي	10
					زيادة المصاريف الإدارية	11
					تغير سعر صرف العملة المحلية بالنسبة للعملات المستخدمة في العقود	12
					الاعتماد علي البنوك ودفع فوائد عالية	13

5	4	3	2	1	أسباب توسعية	iii.
					فتح فروع جديدة للشركة في محافظات أخرى	1
					زيادة عدد المشاريع لدى المقاول	2
					زيادة حجم المشاريع عن المعدل	3
					تغير مجال تخصص المقاول	4
					ضعف في توافق تطور الشركة مع العمل الإداري	5
					تغير من عمل حكومي إلى خاص أو العكس	6

5	4	3	2	1	أسباب بيئية	iv.
					هبوط في الحالة الاقتصادية في البلاد	1
					غياب القوانين والنظم لصناعة المقاولات	2
					نظام الترسية على أقل الأسعار	3
					عدم وجود محاكم مختصة لفض النزاعات بين أطراف التعاقد	4
					تدخل المالك في مرحلة التنفيذ	5
					سوء الطقس	6

5	4	3	2	1		7
					النظام الضريبي في البلاد (القوانين ، نظام المحاسبة الضريبية ، الفاتورة الصفرية ...الخ)	
					الفوز بالعطاءات غير كافي	8

5	4	3	2	1	أسباب سياسية (الأسباب الآتية ناتجة عن الوضع السياسي ومتأثرة به)	.v
					الإغلاق علي القطاع	1
					تقسيم القطاع إلي مناطق	2
					سياسة البنوك	3
					احتكار السوق	4
					غلاء المواد	5
					نقص الموارد	6
					التعاملات مع الموردين والتجار	7
					القيود على استيراد المواد	8
					تأخير الحصول على المستحقات (الموارد) المالية من الممولين	9

شاكرين حسن تعاونكم ،،،

الباحث / م. خالد عبدالرؤوف الحلاق

Annex 2

Part 1: Organization Profile

1. year of establishment:

2. poison:

    ☐ Director   ☐ Vice director

    ☐ Project manager   ☐ Site/office engineer

3. Number of employees _____

4. Number of labors

    ☐ Less than 50   ☐ From 50 to less than 100

    ☐ From 100 to 250   ☐ More than 250

5. Number of project

    ☐ Less than 10   ☐ From 11 t o 20

    ☐ From 21 to 30   ☐ From 31 to 40

    ☐ More than 40

6. Years of experience in the line of work

    ☐ Less than 1 year   ☐ From 1 to 3 years

    ☐ More than 3 to 5 years   ☐ More than 5 to 10 years

    ☐ Over 10 years

7. Volume during the last 5 years

    ☐ More than $10 million   ☐ From $5 to $10 million

    ☐ From $1 to less than $5 million   ☐ From $0.5 to less than $1 million

    ☐ Less than $0.5 million

Part 2: Causes of Contractor Failure

Symbol	Meaning
1	Very low influence
2	low influence
3	moderate influence
4	high influence
5	Very high influence

I.	**Managerial group**	1	2	3	4	5
1	Lack of experience in the line of work					
2	Replace key personnel					
3	Assigning site engineer					
4	Bad decisions in regulating company policy					
5	Labor productivity and improvement					
6	Use of project management techniques					
7	Company organization					
8	Procurement practices					
9	Claims					
10	Internal company problems					
11	Owner absence from the company					
12	Using computers applications					
13	Frauds					
14	Neglect					
15	Using of documentation system					
16	Lack of experience in contracts					
17	One man rule					
18	Inflation					
19	Communication system					
20	React to change					
21	Commitment					
22	Competent consultation					
23	Control system					

II.	Financial group	1	2	3	4	5
1	Low margin of profit due to competition					
2	Cash flow management					
3	Estimating practices					
4	Dealing with variation order					
5	Bill and collecting effectively					
6	Controlling equipment cost and usage					
7	Evaluation of profit yearly					
8	Employee benefits and compensation					
9	Material wastages					
10	Lack of capital					
11	Mistiming of capital expenditures					
12	Difference of local currency exchange with contract currency					
13	Depending on banks and paying high interests					

III.	Expansion group	1	2	3	4	5
1	Opening a regional office in other governorates					
2	Increase number of projects					
3	Increase size of projects					
4	Change in the type of work					
5	Lack of managerial development as the company grow					
6	Change work from private to public or vice versa					

IV.	Environment group	1	2	3	4	5
1	National slump in economy					
2	Absence of construction regulations					
3	Award contracts to lowest price					
4	Absence of specialized courts					
5	Owner involvement in construction phase					
6	Bad weather					
7	Accounting and tax practices					
8	Insufficient award of contracts					

V.	Political group	1	2	3	4	5
1	Closure					
2	Segmentation of Gaza Strip					
3	Banks policy					
4	Monopoly					
5	High cost of materials					
6	Lack of resources					
7	Dealing with suppliers and traders					
8	Limitation on importing					
9	Delay in collecting dibs from clients					