CRITICAL SUCCESS FACTORS FOR CONTRACTOR FIRMS IN BUILDING CONSTRUCTION OF PAKISTAN

By

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(2009-NUST-MS PhD CE&M-24)

A Thesis submitted in partial fulfillment of

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This is to certify that the

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<u>DEDICATION</u>

To my parents who changed their next generation by educating them and became source of light for many peoples, and my wife and daughters, whom love gave me strength and courage to fight odds in my life.

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(__Javaid Iqbal__)

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ABSTRACT

The construction industry is vibrant in nature due to the increasing innovations in technology, constraints of budgets and modern development challenges. The study of critical success factors (CSFs) is unique and different method to nip essential elements for project success.Building construction projects in Pakistan gave a new dimension to construction industry; but success in this field cannot be achieved without having competitive contractors, cconsequently, focus of this research is to identify variables which are necessary for contractors to gain success in building construction projects. Project management, organization structure, organization resources, competitive strategy relationship, bidding, marketing, technology and external environmental factors are identified as critical success factors for contractor's success in building construction projects. Survey has been conducted in the form of interviews in order to evaluate the important factors focused by contractors in Pakistan to gain success in this business.The data collected from survey is then analysed in order to gain contractors view about these identified factors from literature and identify the critical factors in order of their priority of focus. This study found that competitive strategy; bidding, marketing, organization resources and relationship are the most important critical success factors in the order of their priority. The focus on these critical success factors can produce better results in the project execution and turns in to a profitable business for the contractor. The CSFs in this study provides a direction for the contractor's for managing its resources and client's to assess the competitiveness of contractor firms in order to get a maximum advantage in the particular context of Pakistan construction industry.

Chapter 1

INTRODUCTION

1.1   BACKGROUND

Success is the primary goal of every business venture. Construction business is the most demanding among businesses and to stay alive in it, success is the key. Due to advanced architectural features, new innovative designs, complex structures, size of structures becoming gigantic, introduction of modern techniques and machinery and adding time constraints it is necessary to focus on critical factors in the execution life of the project. Thus, contractors need to have more focus approach towards the critical features of the project to stay competitive and successful in the industry. Success always have many stories but losers have none therefore success vary in terms of definitions, in most simple manner success is defined as achieving targets and meeting expectations. Due to these changes in the construction industry the focus has been shifted in identifying success or failure factures of the project all over the world. Time, cost and quality are conventional parameters for identifying success. Now it is the time to go deep in identifying the features or elements (CSFs) which contribute towards the success in order to save enormous loses and valuable future of the construction company.

Number of researchers contributed in identifying success factors, mostly focused on management practices and system existed in the company. Hutchings and Christrofferson (2001),had focused on housing industry of United States during their study, they evaluated number of factors from their study, e.g. producing quality in workmanship, selecting professional sub-contractors, making honesty as the policy feature, by increasing communication between various tears, selecting reputed firms, targeting time during project life and selection of quality employees makes the difference. Although a few studies have identified success factors affecting the success of an organization for example, the factors identified by Kale (2002), includes organization structure, relationships, competitive strategy, and generic resources.

Risk is the imperative element in the construction business, which if not managed properly may leads towards failure, therefore it is necessary for the companies to devise strategies to focus on factors which lead them to success. Detail working reveals large no of factors in every stage of the project, which is practically impossible to meet, therefore we need to focus on few but important critical success factors which leads Construction Company to success. Implementing these factors might require some additional resources e.g. financial, trained expertise of some specialist like management peoples and need time to focus on these aspects. But the impact which will be received by following these critical success factors is far more beneficial than the investments; large scale projects essentially need these factors to be focused upon in order to control wastage of time, resources and cost factor of projects.

Therefore it is very important to identify these factors and implement in the construction industry so that maximum benefit can be achieved from these, which will contribute ultimately towards the success of the project. In this study I have focused upon, studying building construction projects with the preview of contractor and developing the checklist of critical success factors so that projects like that can be managed efficiently and purposely. I have targeted major construction zone of Pakistan i.e. province of Punjab and federal capital, where seventy eight (with no limit contractual power) construction firms are working in the field of construction.

1.2 SIGNIFICANCE OF THE STUDY

Construction industry plays a vital role in the development of the countries researchers have found that its value addition in GDP of any developing country is about 10 to 12 %. Surprisingly this one industry is source of supporting to number of other industries in the country e.g. manufacturing of steel, cement, electrical accessories, manufacturing of sanitary products, bricks manufacturing, paint industry, wood products and number others. Apart from supporting these industries the most important impact gained by promoting construction activities in the country is resolving the problem of unemployment by creating thousands of job

opportunities in construction and supporting industries. Therefore it is vital to give boost to construction industry for improving economic health of any country.

Construction industry in Pakistan is growing much faster than expected, if we study the past the construction activity in the country got a major boost. Last ten years in the country we have seen construction activities on massive scale which include infrastructure development, commercial and residential buildings. Still there are number of major projects in pipeline i.e. construction of Gawadar port and allied facilities. This industry in Pakistan is getting focus of national and international developers; therefore it is very important to focus on removing major impediments in the success of this industry. Conventionally contractors were uneducated and successful when the structures were simpler but due to major shift in architectural requirements and complex structural designs this field is demanding technical expertise and processionals. Therefore there is a strong need to focus on resolving variety of issues i.e. management aspects concerning this industry in order to improve its performance and competitiveness.

Therefore, improvements in construction industry performance have a major economic impact. Systematic performance improvement demands also systematic means to measure performance and its development. However, no systematic and comprehensive way to measure the competence/success of a contractor in the industry exists. As a consequence, most of the time selection of construction companies/contractors for new construction projects takes place on historical data's and personnel liaisons.

Therefore the focus of this research is to develop the framework of critical success factors for contractor's success in building construction projects and making it a tool for checking the competency of contractors in the light of critical success factors evaluated after this study. The main focus was on practical implementation of theses success factors and on comparison of these success factors of the participating companies/contractors.

1.3   PROBLEM STATEMENT

Mostly the construction projects are not completed within the planned estimates due to variety of reasons. This practice has changed perspective about the construction industry that the construction projects rarely completed in the cost effect as they are planned. The recent economic situation in the country resulted construction projects get halted due to this major issue. Engineers and contractors are now focussing to target those areas which results economising the cost of project in order to stay in the market. Therefore, a contractor firm must target the problem areas and find the factors which results to the winning combination for the contractor. Factors varies from project to project with respect to scope of the project, complexity of design which demands technological implications, size of the project, budget of the project and lot others. Focus of this research is on studying and evaluating the critical success factors necessary to gain success in the building construction projects in Pakistan with the perspective of contractor.

1.4   OBJECTIVES

The main focus of this research is evaluating a framework of critical success factors for contractor so that he can focus upon element of success in this field and giving him the opportunity to access various dimensions of competitiveness in different stages of project implementation. Identified objectives are as follows:

- To study the success factors for building construction projects through a detailed literature review.
- To identify the critical success factors for building construction projects with contractor's perspective through survey based interviews.
- To suggest the critical success factors for contractor's success and clients to assess the competitiveness of contractor in building construction projects in Pakistan.

1.5   SCOPE OF THE THESIS

Contractors who are involved in major construction projects are registered with Pakistan Engineering Counsel as 'no limit contractor firms'. It was impossible to

reach all the contractors registered with PEC with in this short time therefore focus have been shifted to contractors involved in major construction zone of Pakistan i.e. Province of Punjab and Federal capital. Contractors, senior management official, Project managers, construction managers of these construction firms were targeted and interviewed according to the questionnaire.

1.6   STRUCTURE OF THE THESIS

The thesis comprises of five chapters.

Chapter 1 starts with background and introduction to the topic and its significance to Pakistan in general and to the construction industry in particular. The body comprises of objectives of this research and then pinning the scope of work.

Chapter 2 focus on the literature review concerning critical success factors for contractor firms in building construction projects. The factors have been identified through previous works and focussed with respect to Pakistan construction industry.

Chapter 3 explains how to move forward with this research, starting from questionnaire then collection of data from construction industry and then moving towards the methodology of analysing this data in order to reach final objectives.

Chapter 4 includes detail statistical analysis conducted. SPSS 17 software is used to conduct test of normality, following non parametric test (test for means, relationship test among the factors) and finally discussing descriptive statistics along with analysis and results of the variables.

Chapter 5embodied conclusions relating to the work and suggestions/recommendations are made to bring further development in industry.

Chapter 2

LITERATURE REVIEW

2.1   INTRODUCTION

Project management came into focus in 1950's with the development of technique like Program Evaluation and Review Technique (PERT) and Critical Path Method (CPM). Management of complex military and industrial projects became the emergent need of the industry. Chemical industry became the origination place for modern management procedures, (Morris 1987).

In1960's-1980, number of researchers focused on defining parameters for success mainly in context of construction industry and production of goods. Troubleshooting and client satisfaction were not the main focused areas at that time. In70's researchers started focusing success parameters other than time, cost and quality aspects. Kerzner (1995) evaluates that, success of any project depends upon achieving the purpose of construction of the structure. Rockart (1979), in his work, gave a new dimension to project success, he proposed that "for any business, there are the areas which if results positive, will enhance the competitive performance of the organization. They are the few key areas where 'things must go right' for the business to take road of success."

In the 1980s, new definition emerged for project success which focused towards achievement of following objectives timely completion of assigned task/project, Completion within the estimated cost, Achieving desired product quality. The quality can be defined as targeting and implementing detail specifications given in project BOQ's and drawings (Kerzner 1995).

Baker, et al. (1984) expressed that project success factors are not very clear in the previous studies. Focus of studies was less on activities involved in construction, and the variables considered were involving more of conceptual strategies, the results obtained were less focused on specific success factors for construction projects. De Wit (1986) and Morris (1988) concluded that "project

success and failure should be defined according to specific perspective like success is different from contractor's perspective and owner's perspective. They expressed that success have different meanings for the peoples with different perspective and different results will be there when targeted with respect to time.

For over 50 years, Researchers limited the definition of project success to traditional project success according to which success is just seen as factors affecting the iron triangle targets, Time, Quality and Cost (Scott-young and Samson 2004).Belassi and Tukel (1996) expressed that the success factors varies with respect to different forms of businesses. For example, "top management support" was considered important in many business areas, but in construction projects factors use of technology is considered as one of the important factor. Thus, the success factors need to be specified for construction site operation in particular as well. They have concluded that if project overshoots its planned completion date, or expense increases than as planed or outcome is not as it was planned the project was assumed to be failure.

2.2   PROJECT SUCCESS

"Success means gaining advantage, superiority, accomplishment and achievement in terms of completing any project with in time, cost and desired quality aspects"(Shenhar, et al.1997). Fryer (2004) describes project success as "Projects are about managing expectations of the projects, and expectations have to do with perceptions on success. Project success is a complex and confusing concept and it changes over from project to project and product life cycle".

There is universal formula for measuring the success of project. The indicators/criteria of project success varied from type and size of project, specific to one industry and from people to people. Numerous researchers have investigated the measurement of project success since 1960's, and especially so during last two decades.

While finding out the key nodes of success remains the focus of many researchers. One way to express project success is to achieve the planned targets by focusing on the resources required to achieve them and then utilizing these

resources according to timeline (Tuman1986). Dewit (1998) illustrated "success means achieving desired specifications and technical aspects in time. Satisfaction level of success varies with different peoples involved in project e.g. for contractor it is to save desired targeted profit margin and for owner it is to get quality product in time and planned cost. Ashley (1987) expresses success as achieving goals "better than expectations". Most of the authors defined success by focusing more towards gaining desired goals and specifications.

Giving another dimension to success, "performance" includes performing different procedures involved in construction in desired manner. Focus has been made by performing safely, keeping time factor as focal point, achieving desired quality standards and giving productivity (Jaselskis, et al. 1991).

Pinto et al. (1988) provoked the idea of measuring project success as achieving the desired satisfaction level of different team members involved in construction project. Alarcon & Ashley (1996) have defined success, achieving these factors: effectiveness of structures and team members, efficiency of these team members, producing quality product, giving productivity, gaining profit from the project and by promoting innovative ideas. Barney (1991) studied comprehensively to assess project success. He focused mainly on safety, economizing the cost effect of the project and end user satisfaction as the success feature. Pocock, et al. (1997) studied success factor in the framework of legal claims, he graded project as success when there is no occurrence of any accident during the life of project, and safety is regarded as most important feature because accident consumes the reputation of the contractor and lots of expenditures in litigation/legality procedures, which results into ultimate failure of the project success. In the literature, success was linked to performance parameters. Kumaraswamy and Chan (1999) regarded success in terms of number of parameters which include working in estimated cost, following time line, maintaining quality during work, owner and end user satisfaction, safety first to be followed and working in the safe environment. Conventional success parameters were focused upon named as 'iron triangle' which include no extra time granted during project life, no additional cost factor and production quality should the

prime feature to measure success of any civil engineering adventure (Belassi and Tukel 1996; Atkinson 1999).

Chan and Kumaraswamy(1997) defines successful project as one which do not put extra burden on finances, timely completion, end user comfort level with the project, getting desired quality of work and absorbing any extra pressure during execution. Shenhar et al. (1997) gave success parameters in the residential/commercial housing industry, they defined success in different parameters, they say success is measured in four stages first stage includes life cycle of execution stage and immediately after completion of project. Second stage starts after handing over to customer, third stage starts when project is sold in the market and final stage is assessed after three to five years of completion of the project.

A project is considered to be successful if it is satisfying both internal and external parameters. Internal parameters include completion in time, remaining is estimated financial figures and meeting designed specifications. External satisfaction includes end user satisfaction which becomes the source of good or bad reputation for the contractor. This method of measuring success is regarded as total quality management (TQM) (Kerzner, 1995). Baccarini (1999) gave a new way of expressing or judging project success. In his study success can be measured in two dimensions, in first dimension measuring management success which is gained by achieving conventional parameters strictly following time line, working with in the defined cost and attaining desired quality in workmanship. Second dimension says that success can be measured in terms of product success, which means acceptance of the product in the market and by the industry.

Atkinson (1999) studied the building projects and devised a strategy to define success of these projects in two steps. Firstly 'delivery stage' where success is measured by achieving completion of project in desired time, estimated cost, gaining desired quality standards and effectiveness of the project. He further divided second step into 'system' and 'benefits', system deal with beneficiary of the project which involves all stake holders and benefit deals with project impact in the society/customer along with its acceptance in the market, thus ultimately

promoting business. Lim and Mohamed (2000) in his work explain that success varies from one stakeholder to other stakeholder view, those include owner, contractor, customer, etc. Success has different meanings when comes to the perspective of individuals. Both writers agree on studying success at macro and micro viewpoints about the project.

Walker and Vines (2000) in their work divided success into four different directions and defines success is achieved by gaining or combining the results of all four directions. Success in the first direction is achieved by working accordingly to the contractual requirements i.e. following specifications and quality standards rigidly. In the second direction success is achieved by gaining end user satisfaction means working with quality standards. In the third direction success is measured by the achieving desired satisfaction of parties involved in the development of the project. In the final directions results are focused on utilization, benefit and value addition of the project towards overall development of the city and the country. Finally ultimate success is gained by combining the results all these four directions.

Cooke-Davies (2002) focused on the project success and project performance. He defines these two parameters first is linked with completion of work and second is linked with targeted life of project. This study attempted to examine the project success after project completion. Cox and Townsend (1998) found that meaning of success varies from construction executive perspective and project manager ones. In addition, the authors asserted that perceived factors vary depending on the experience of the respondents and suggested that there are some common factors for all construction projects regardless of divisions.

Dhen, et al. (2004) expressed success as "The successful project is the one which involves satisfaction of all the stakeholders involved". Setting it as objective is not always possible to achieve but, as project managers, it is a key to success. Emphasizing again the simplest way of defining a project as successful is to just to achieve three primary objectives and theses, delivery or completion of project in time, completing it with in the budgeted cost and meeting standards of quality by achieving desired specifications in construction.

2.3   CRITICAL SUCCESS FACTORS

Critical success factors are the factors or the focal nodes, presence of which will result into success of projects. Another definition expresses those few things which require special attention in order to gain success by different stakeholders i.e. project manager, construction company etc. therefore special attention is given to theses points/things to gain success in the projects. Different authors regarded different factors as critical according to the countries, technologies, environment and type of construction projects they are focusing upon.

The critical success factors (CSFs) approach was first used by Rockart (1979), in his work, he describes CSFs as "in any business, there are few areas in which satisfactory results are necessary to ensure successful competitive performance of the organization. They are the few key areas which must go right for the business to prosper."

Rockart (1982) gave a framework of obtaining critical success factors for any business in three phases. This research develops a key question, what are the steps which are necessary in order to make any project/task successful?   Three phases in order of priority discussed below:

- Generating critical success factors (CSFs): Focus in this phase is, "what are the factors which require focused approach to get successful in the business?"
- Refining (CSFs) into objectives: Focus in this phase is, "What should the organization's objectives and targets with respect to the critical success factors?"
- Identify the means to measures performance: Focus in this phase is, "How will we know whether the organization has been successful after following these factors?"

This approach of identifying CSF for any task gave a new dimension to the researchers. This technique is applicable to almost any task/assignment existed in the field. Outcome/results gained by this study are enormous because stress is

developed at the right place to solve or achieve desired results. Different researchers explain CSFs in their own way depending upon the field they are targeting. Boynton and Zmud, (1984) defines CSFs are the few and vital/nodal points to be focused for success in any business. CSFs are the areas which necessarily require focus of managerial peoples in order to obtain desired results. Their impact depends upon justification of these critical success factors. The study of these will help in preventing organization from unwanted surprises/omissions. Identification of these depends upon the environment, resources and strategy adopted by the organizations to grow in the business (Nahapiet1985).

Critical Success Factors are the areas and points which require special attention in routine operational activities and continuous focus is necessary for ensuring success in future ventures (Boynton and Zmud1984).CSFs are defined as characteristics or special areas which need continuous focus to perform well by the organization (Kerzner1995). Lim and Mohamed (1999)explain that rightful determination of CSFs is empirical to the success and failure in any field. Wilson (1997) in his research found that adopting of CSFs is necessary for success of effective programme management. Good performance by any business entity and assurance of success is linked with rightly targeting the CSFs.

In order to address differences among projects, Shen, et al. (2003) presents a diamond shaped framework in order to help managers for distinguishing different projects according to four dimensions: novelty, technology, complexity and pace. These four dimensions the author defines as four bases of successful project.Rowlinson (1999) in his work define CSFs as those important elements in any task, which must be focussed and emphasised so that the project can be executed in an efficient and effective manner. CSFs are the areas which, must be communicated to all team members so that team effort can be obtained to work upon them and desired results can be obtained.

Freeman and Beale (1992) gave seven dimensional approaches for measurement of success; five out of them are more prominent and needs continuous attentions which are industrial performance, effectiveness in implementation, Targeting end user or customer requirements, individual growth

and Manufacturability and industry performance. Performance of any project may be accessed and reviewed by all important stakeholders. Success definition is linked with the perspective of the peoples. Pinto and Slevin (1988) also worked on critical success factors for projects during their whole life cycle and found that factors varies with different phases of the project.

2.4 CRITICAL SUCCESS FACTORS FOR CONTRACTORS SUCCESS

While working on mega construction projects it very difficult to focus on each tiny aspect of the project/work by the managerial peoples or contractors because it will be requiring lot of resources, time and money. But it does not mean that the contractor is not interested in making the project into successful product. Therefore it is necessary to determine the key elements which require attention at all time. These crucial factors will be few but valuable one, which desires continuous attention of requisite staff to ensure success in the business. Therefore success can be targeted with limited resources by rightly evaluating CSFs.

Sanvido et al. (1992) determined critical success factors of sixteen different building projects. They arranged the projects in eight pairs, where each pair of projects was similar in scope but one project was considered successful and other one was viewed as less successful. The questionnaire included 35 variables in seven categories, which were: facility team, contracts, experience, resources, optimization information, product, and external elements. His work concluded that facility team, contracts, experience, and optimization information are important in order of their priority whereas the other three were less dominant.

Studies and efforts are focused on general and specific critical success factors for example; profitability, growth, customer service, delivery reliability, competence, and motivation (Hubbard 1990). An effort has been made in investigating the critical success factors of project management practices in Pakistan's construction industry. The top ten critical success factors were identified. These are establishing project goals and client criteria, leadership style, Clarity of

scope, defining work, project manager's characteristics, client's own organization, project teamwork, planning and programming techniques (The News 2000).

Nahapiet (1985) studied building structures projects in the United States and United Kingdom by focusing on managerial impact on the success of projects and impact of various types of organization structures on outcomes of these projects. He emphasized on management aspect that it role starts from planning till completion of the project. Sanvido et al. (1992) determined CSFs for building projects by emphasizing at planning stage; which definitely require identification of CSFs at lower level so that they can be implemented on the project practices. The critical success factors were more focused on planning strategy and found important for success of other phases only if CSFs are determined at lower level goals. These are broken down into lower level goals for organizational units and individuals, which define the goals of the organization. Goals can be divided into business, operational, and supportive level goals. Determining the goals are followed by measurement. Each goal area has three to eight important key sub goals and indicators (Smith 1998).

The measurement system or evaluation procedures are meant to judge the performance of the company and it gives ways / means to improve its performance. 60 indicators have been identified which contribute to the success of contractor in Pakistan building construction industry. These 60 indicators are divided among nine success factors according to their effects, these nine success factors are regarded as critical success factors, which are "project management", "organization structure", "organization resources", "having an explicit competitive strategy," "developing a good relationship", "winning enough contracts by adopting successful bidding strategy," "marketing", "technology", and "external environment factor". The nine critical success factors act as backbone for other indicators and they differ according to their contribution towards the success of the project. Results obtained from this work will enable contractors working in Pakistan and contractors working internationally to invest in this Pakistan construction industry; it will guide them to focus on the area which is more critical to get success in this industry.

The CSFs and indicators will identify current conditions of Pakistan construction industry and will identify criteria's for success in this industry. However, it should be recognized that the CSFs may vary from size of contractor firm and size of projects and the agency under which the projects are executed. Managers should investigate the CSFs periodically to see the effects of latest advancements/changes in the market in order to maintain competitiveness/success in construction market. The CSF approach is very useful method to develop the key nodes of the business, and give chance to contractors to evaluate their performance, and success basing on these factors.

In the literature various researchers have focused on various critical success factors important for the success of contractor. In the coming paragraphs the importance of nine selected success factors are discussed in detail with perspective of various researchers.

2.4.1 Project Management

Eighteen indicators are selected under this critical success factors and are tabulated as such in the questionnaire. Porter (1980) highlighted that firms can gain success and competitive advantage as the keep on delivering their products and projects, but failure of the projects may lead them to failure in the business and can seriously damage their reputation. Therefore, it is necessary to take the construction projects as products in order to achieve the successful advantage in terms of focus. Additive advantage from this survey will be to highlight the importance of project management in construction industry and its present position/knowledge in the industry will be accessed.

Considering the project management indicators such as quality, time, cost and contract management, all these indicators are given desired rating by the professionals in the industry. Dispute resolution procedures are more common then adopting court procedures because judicial system is still in the process of maturity due to inadequate laws, and reforms existed in the legal system. Rowlinson (1999) worked on the approach by combining the principles of total quality management and conventional project management, which focus more on controlling cost,

quality and time. They suggested that quality should be given equal importance in execution, and how to ensure this during execution by working or studying cultural aspects of human being. They emphasize culture should be the focus of management system so that critical faults which are creation of human behavior can be studied and focused.

Attributes like project management techniques, quality management, cost management, contract management, dispute resolving skills, time management, site management, risk identification and allocation, project managers experience, knowledge/expertise on law, environmental management, project insurance, claim skills, health and safety management, resource management, documentation and record keeping, plant management and finally the overall managerial actions will affect this success factor. Project management plays a vital role in the success of the projects (Hubbard 1990). Jaselskis and Ashley (1991) add that with use of right management tools, chances of good planning success increases for the project. Variables necessary for management success includes contract management, control mechanisms, feedback capabilities, troubleshooting, coordination, effective decision making, monitoring, organization structure of project team, planning and scheduling, and expertise in managing the projects (Belout 1998; Chua et al 99; Walker and Vines 2000).

Site management among other technical issues is one important aspect in making project management successful (Scott-Young & Samson, 2004). Project manager plays vital role in successful completion of any project he is the person who is source of integration of different departments with in the organization. Qualities of project manager varies from person to person however a professional project manager should possess following abilities in order to play ideal role i.e. he should be flexible and adaptive in nature, possess leadership skills, motivated, confident, capable of talking initiative, aggressive and demanding by nature, persuasive, good language skills and should be fluent at that, ambitious, enthusiasm, imagination, spontaneity, strong sense of dealing technical issues in time, controlling cost by managing the resources, well organized and most importantly a willing worker (Archibald, 1976). Turner & Muller (2005) worked

on the impact of project managers role in the success of project, they find that project management literature gives very little credit to project manager, which disregarded the impact of project managers dedication, commitment, competence, experience towards projects success. Different studies are on the way to see the effects of project manager's competence and style of commanding on the outcome of the projects being the dominating factor of success for firms. Here is another way of seeing success; persons involved in implementing it consider it success where as customers perceived it in different way (Pinto &Slevin, 1988). Examples are there where companies have devoted all the resources available with them but projects outcome was still not good in the figures of the company, but it happened that such projects got appreciation by end users and remain as source of income for company for many years to come (De Wit, 1986). Project varies from one to another, similarly application and utilization of management techniques need to vary, and that is what makes project management difficult. Strong link of success with project management and its practices makes it attraction towards researchers.

2.4.2   Organization Structure

Channon (1993)in his work concluded that organization structure plays a very important role for smooth management, integration of effort by various departments within the company. Selecting wrong organization for the construction company may result in to wastage of resources, funds and manpower. There exist no standard organization structure for construction firms, but there are some key factors which required to be focused in formulating an organization, which are the controlling force for promoting contractor's success. normally, these include Leaders personality and capabilities, Motivation and job satisfaction, arrangement between management and staff, Suitability of organization structure with respect to the project environment, Communication and liaison among functional departments, Firm's history, Firm's size, Organization culture, clearly specifying the duties of each department, Company's domestic environment, Selection of key personnel, Recruitment system which include permanent or temporary staff.

Waraszawski (1996) gave a model named as "Project Excellence Model", model is based on evaluating success of project in terms of organizational

perspective. The model says for a successful project, there is a need to address the issues concerning the organization; by focusing more towards result based organizations. The suitability of organization structure has special significance for Pakistani contractors. In Pakistan national contracting companies are mostly overstaffed and have a bureaucratic organization structure. There is a need to reorganize these organizations/firms according to the competitive markets and developing them into more of commercial organizations. A "modern enterprise system" will make them more competitive and successful in the construction business.Staudt (1991) gave a thought that "Understanding culture is the starting point for learning the significance of management, the values that directs action of staff and behaviour of key players". The majority of the project management literature, especially where it deals with the construction industry, approaches project performance from the management perspective and focus on planning, controlling, and other management functions. However, the idea of emphasizing the effects of organization structure in project operation and success has been discussed in some studies pertaining to the construction industry.

2.4.3   Organization Resources

After going through the literature concerning organization resources, seven indicators are gathered for this critical success factor' organization resources'. Importance of this factor can be under stood by understanding the fact that when there are firm specific resources are available then, project execution stage is very smooth and project manager is capable of utilization of these resources in this most optimum manner. On the other side when firs are dependent on others for the resources then the time line and cost factor also go beyond the estimated figures. Therefore success is invariably link with the enhancement of organizational resources (Barney 1991).

The role of human resources remained the element of focus by the writers working on field of construction management e.g.(Griffith 2004; Fryer 2004). Pakistan is very rich in human resource element; problem lies in the utilization of these resources because there is very less space existed in the market which is driving our peoples out of the country. Lower end in human resources is the labor

works are mostly from the villages. However the cost of this labor is very less which makes Pakistan's construction industry more competitive in nature but the strong deficiency exist in training institutions for on job training which creates problem for the contractor to select right trained peoples for the job, results into wastage of effort and fighting for success parameters(Sha and Jiang 2003).There was era when management peoples don't have space in Pakistan's construction industry therefore there was lack of formal education system in management aspect but now complex designs and bigger projects have increased demand for management professionals. Now the institutions have started focusing on this aspect so that shortage can be recouped and this will help our industry in global competitiveness (MOC 2004). Indicators 31, 32, 33 and 34 in the questionnaire emphasize the importance of finance for smooth functioning of construction business, which usually involves large sums of finances. However, low ranking of these indicators indicate that in Pakistan is at the verge of big investments in the field of construction but now the era has started when mega projects are in place, importance of these variable will invariably increase.

Organizations are the transformation systems that turn resources into products, services and other, perhaps non-measurable results. If the availability of resources doesn't vary from site to site, then it cannot be the critical success factors. Moreover the indicators include Cash flow management, Financial resources, Financial ability, Financial stability, Current capacity of human resource, Sustainable development of human resources, and State of own plant& equipment. These variables will invariably express the type and strength of organization which helps in smooth management of finances and human resources (Chua et al. 1999).

2.4.4   Competitive Strategy

After going through the literature four main indicators related to this critical success factor have identified. After going through detailed survey it became obvious that people do not realize its importance in these words but they do realize the existence of strategy in any business. Company's strategy defines how to get business, how to bring company in the line of good project, strategy defines role of

company in the execution stage and strategy defines how to stay in the market and generate reasonable profit from the business. No of writers emphasized the importance of deliberately laying out the strategy for the company and it is the prime feature which guides companies towards growth in the business (Warszawski 1996; Betts and Ofori 1992). Major indicators identified by this study for measuring competitiveness of company are strategy how to compete in the market, strategy matching to a company's situation (may be link to the resource factor and financial strength of company), effectiveness in implementing the strategy (ways and means adopted by the company to target the designed strategy) and Strategic awareness and perspective (awareness of this important factor among the key players of the company).

These indicators increases the awareness among the contractors regarding the existence of these policy figures in the charter of their company in order to gain success and advantage in the construction market and business. Planning is one of the key areas to gain advantage in the market. Warszawski (1996) explains programme planning working on series of projects and developing consensus among the stakeholders and selecting the procedures for execution and control of the programme. Belassi and Tukel (1996) also suggest that successful projects do not happen just out of the way they need detailed planning at all stages of the project. Planning is the prime feature to get success and should be comprehensive enough to handle difficult projects, in unstable environment to execute them in a very smooth way. Young (2006) again highlighted the importance of planning, he emphasised company's objective starting from procurement of project till completion of project need to be worked out in detail. Talking of programmes their success is dependent on detailed planning and execution of individual projects, and competence in planning of projects will give the guarantee of success of programme (Shen et al.2003).

Performance must not be puzzled with business strategies and decisions, strategies are not made for one proposition, and performance is a major factor in business success. Performance is the ability of firm/organization to implement the targeted strategy (Cooke-Davies2002). If there is some fault in strategic policy

decision, the business may not succeed in the longer run beside the temporary gains. However, strong business strategy is supported by innovative ideas of implementation and gaining good performance.

Corporate business strategy plays a role is in the background of the performance cycle, which starts by creating/developing departmental aims and specifying individual targets, and then by evaluating performance, feedback helps in gaining good results (Slaughter 1998).

2.4.5   Relationship

The Russian develops a new mechanism of protection and cultural shifts by analysing their historical issues, a friendship is more important than law, for security/protection in the society a person needs to join/part of a group and do not develop trust peoples of other group particularly to more powerful one (Kale 2002).

Kale expresses the importance of relationship in the success of business. A two-way support system has become the prime way of promoting business. It becomes imperative for any businessman to develop good relations because he needs to get business to stay in the market, procurement of business becomes easy. Good relations assure gaining of opportunities for different jobs available in the market. Above all developing good relations with other peoples in market will mitigate risk for failure. Strong relations are important to ensure for smooth functioning during the execution stage, being rough to the peoples in management is the source of creating number of problems which will hamper the speed of the project, will result in wastage of resources and timely completion will become the prime problem, which ultimately leads to the failure of the project from contractors perspective. Relationship with all peoples involved in the project need to be frankly that includes owner, project manager, subcontractors, and suppliers and even with general public where you are executing your project. These all important aspects have been highlighted in the questionnaire. Shen et al. (2003) also stressed the importance of having good relations with all the key players in the business. Kale (2002) also focused that importance of relationship should also be the part of company's strategy.

Chua et al. (1999) suggests businesses need to develop in order to shape the future and for success in business it is important to establish good relationships with customers; the strategy of winning in the business cannot be attained by avoiding the aspect of good relationship, he emphasised to keep all the key players in the loop.Walker (2000) also emphasized on good relation with client and his representative in order to complete project in time.

The companies in this survey are not successful because of any corruption In fact; money is not the best way of approaching the matter. It might very well be the personal relation to the governor that is essential for the project outcome.

2.4.6   Bidding

Contractor or Construction Company needs to stay in business to survive, and for that it is very necessary for them to focus on procurement practices of the company. Companies need to hire experienced staff for preparation of bidding papers and it should be very clear in the strategy of the company what modes will be adopted to get more business. Talking of Pakistan's construction industry the prime features are, there is lot of competence in the market due to low profitability rates, secondly labor rates are intensively low comparing to the international market, thirdly simplicity of laws of this industry makes a attractive business for everybody therefore expertise in this field of bidding becomes more important. Bidding is effective way of getting knowledge about the contractor, that how well he is in managing the resources available with him and shows his resourcefulness as well (Shen et al. 2003). It does not matter how competent the contractor is in the field but it does matter how good he is in managing hi resources. Indicators selected to check the contractor's strength in bidding technique are proper bidding strategy, experience in bidding and bidding resources.

Researchers gave lot of importance to this factor of bidding because they consider it as they key to procure business and to stay in the market (Pocock et al. 1997a, 1997b; Kumaraswamy and Chan 1999; Walker and Vines 2000). Dissanayaka and Kumaraswamy (1999)clearly explained that expertise in bidding technique can simply reflect the efficiency and strength of the contractor.

Indicators selected in order to highlight the importance of bidding is strategy of bidding, which simply gives Construction Company the direction to stay in the business. Second measure to check company's strength is experience in bidding, which is the measure of trained staff available with the company; thirdly the focus is organizational resources for bidding, which clearly highlight the importance of the procurement peoples, having right knowledge of market and procedures and existence of team work for this purpose.

Bidding in Pakistan's construction industry is not as simple as it seems, there are still large number of uneducated contractors are uneducated which results in unhealthy competition. It is necessary for the contractor to give right bids because quoting the wrong figures in estimates may result in losing the project right at the outset. Another phenomenon in Pakistan's construction industry, most of the departments either private or public are bound to give the contracts lower bidder i.e.75 - 99% private projects and 100% public projects are awarded to the lowest bidder. This procedural issue restricts ensuring contracts to be given to the right contractors and assuring the quality standards in the construction.

2.4.7   Marketing

Marketing perspective in the competence of contractor is bid different what it seems, for a private developer it is necessary to project its product in the market to gain success, but in terms of contractor meaning of marketing is different then what it seems, because clients in this field are not uniform. One way to express marketing is to make space in construction industry by producing quality structures and acquiring good reputation among the departments/private developers. Lim and Mohamed(2000), expressed that marketing for a contractor is not the feature which can be acquired with in short period of time, this factor can be enhanced and strengthened over the period of time and life of contractor in the construction business.

Marketing feature is linked with number of other factors like resourcefulness of contractor, history of the firm, reputation in this field, relations with departments and private developers and size of the organization.

Lim and Mohamed(2000), expresses that marketing is a feature which require involvement of senior management. However gathering of information about what is going on in the market, what additions are there in the techniques and technology in construction may result into gaining success in this factor, which ultimately adds to the success/strength of contractor.

Short-term goals lead to short-term actions, and outcome of striving for short-term profits is cutbacks on activities leading to long-term profitability, such as education, research and development, and marketing. The choice of what to lay emphasis on in the matrix depends on the purpose of the matrix; its productivity, marketing, quality, or some other type of matrix (Shen et al. 2003).

2.4.8   Technology

The CSF of technology comprises three indicators technological innovation ability, I.T. application and continuous improvement/innovation in technology and research and development. Modern construction practices in building construction demands continuous research and development in this field. Mega building structures involve multistory basements below ground level, even below water level, size and height of building structures have crossed the limits of boundaries .building structures like these cannot be built with conventional methods technology aspect is involved right from the planning of structure till completion of structures, this demands continuous research and development in this field (Hampson and Tatum 1997; Slaughter 1998). Latest constructions involves modern technology in the execution stage, there are very few contractors in Pakistan construction industry who have strong grip on this aspect. Pakistan construction industry is changing its trends in building construction but still techniques and procedures yet to get stable therefore there is lot fear in the contractors to adopt and invest in the new technological features.

The technology is very important to quality management through the quality assurance system. In other words, technology can make possible the optimization of construction execution plan. During the process of working out the construction implementation plan, project manager needs to discuss with technical staff to ensure the construction implementation plan, cost and detailed construction

methods. There is dual thought going on among Pakistani contractors on one hand they accept the need of modern technological features in the construction but on the other hand they still fear to invest in gaining these modern technological aids because of unstable economic and political environment in Pakistan. Numbers of Pakistani contractors are utilizing I.T. applications in planning aspect but they are still in the way of exploring and utilizing all the features of these applications. Now it seems that new era is expected to start in construction in Pakistan which will cross boundaries.

The technology management includes the measurement; experiment; documentation; development technology management objective; the technical methods to save cost; promotion of the new technology; quantify management; other technology method.

2.4.9   External Environment Factors

Environment plays a very important role in nourishment and growth of any civil engineering projects. May it be the social environment, political environment, security conditions and economic environment of the country, all these contribute to the success or failure of the project? Number of researchers are of the view that environment is the key factor in the success or failure of projects. Akinsola et al. (1997); Chua et al. (1999)in their study emphasized that environment is the key factor to control the cost of projects it may social, geopolitical and economic environment, they regarded them as external influences on the project. Pakistan construction industry is working in the variety of environmental conditions like execution of projects is different in the city then in the areas away from population, similarly construction in swat mountainous terrain have high cost impacts then working in plains and security conditions have high cost effect on the projects. However X-factors like corruption, malpractices and natural disasters/bad weather are also important indicators but in this study we will not include them being difficult to rationalize their impact.

Chua et al. (1999) expresses that change in political system of the country have deep impacts on legislation process which also impacts on construction

industry, like price fluctuation in the market by applying taxes and royalties, changing rates very frequently of basic construction material, changing bylaws and malpractices existed in the government peoples makes positive or negative impact on the construction. Economic environment have deep impacts on success or failure of project, like devaluation of currency, unstable economic environment prevents investor to invest in the market. Corrupt government makes the construction process dead slow which ultimately affects all the industries. In Pakistan from last few years the aspect of terrorism activities has disturbed the market in the real sense, contractors are afraid to make investments due to unsecure environmental conditions.

Corruption is one major element which has disastrous effects on the cost, procurement, instability in execution and quality of work. Researchers gave the definition of corruption as "the abuse of public office for private gain". In Pakistan construction was declared as an industry very late and still there are no detail laws existed in the constitution, lot of work is still required in this aspect by the legal experts in the country. Legal framework will streamline the procedures and byelaws, this will increase the confidence of foreign investor in this industry, and this will develop institution s to control this industry. Existence of laws will reduce bribery, malpractices, corruption from the system; it will control and stable the cost factor in the industry because cost is the key factor to gain investors' confidence.

Young (2006) studied construction industry of Thailand and concluded that about ten percent of project cost is lost to these factors, firstly corruption and malpractices existed in the government system, political impact in awarding contracts, engineers and other regulatory peoples expect bribes to give acceptance to the work which ultimately suffers the quality standards of the project, selected peoples are honoured by the departments which kills competition and quality from the industry and these all factors results in price hike and drop the interest of private developer, he becomes either part of them or move out of the industry.

There are few circumstances which are beyond the powers of government or any system like natural disasters which include floods, earthquakes and hurricanes etc. Similarly military coups, frequent change of governments, civil war

and terrorism have major impacts on the survivability of the industry. Pakistan has been part of all these unwanted disasters.

2.5   SUMMARY

The above-presented literature shows that there are nine critical success factors; all these factors have their own indicators which give the face to these factors in the industry and affects contractors' competence in the field of construction. These factors can further be grouped according the attributes they possess; they can be further grouped in four categories. Among these CSFs which we have gathered in the questionnaire, competitive strategy is the most important one, because it defines the strategy for the business. Organization structure, organization resources, relationship, bidding, marketing and technology explains company's internal strength in planning, procurement, organizational strength for projects and operational procedures. Project management is more concerned with the execution and operations at the individual project level. External environment relations are concerned with external environmental effects to contractor's strategy. The four types of CSFs cover the areas of strategy/approach, tactics, operation and external environment implication, which generate the success for a contractor.

Various researchers focus on these critical success factors, summary of perceptions about these critical success factors is shown the Table 2.1.By observing the affects studied by different researchers of these nine success factors, in this study these nine success factors are focused to study their effects on Pakistan construction industry. These identified factors can be taken as tools to identify the problems in managerial/operational aspects of execution of projects in Pakistan's construction industry. Further, these critical factors give us a wide range of indicators that contribute towards contractor's success ranging from planning to execution. Each factor has its own importance and its wait age cannot be underestimated and these will help qualitatively in decision making. The CSFs can provide guidance to the people in the industry in order to find out problems, impediments, flaws in the system and give guideline to investors/developers to focus on the required aspects.

Table 2.1 Summary of Identified Success Factors by Various Researchers

Past work	Critical success factors								
	Project Management	Organization Structure	Organization Resources	Competitive Strategy	Relationship	Bidding	Marketing	Technology	External Factors
Porter (1980)	√					√			
Dewit (1986)	√	√			√				
Hubbard (1990)	√								
Jaselskis and Ashley (1991)	√				√	√		√	
Staudt (1991)		√	√			√			
Barney (1991)			√						
Sanvido et al (1992)			√	√					
Channon (1993)		√			√			√	
Bellasi&Tukel (1996)				√					
Warzaski (1996)		√		√		√			
Slaughter (1998)				√			√	√	
Chua et al(1999)	√		√		√			√	√
Walker (2000)	√			√	√	√			
Lim & Muhammad (2000)			√				√		
Kale (2002)	√				√				√
Cookes-Davies (2002)				√			√		
Shen et al (2003)	√			√	√	√	√	√	
Young (2006)				√					√
Javaid (2013) [This study]	√	√	√	√	√	√	√	√	√

By studying these factors organizations can carry out their assessment about their weaknesses in the system to ensure/increase their strength in the industry. Lot of efforts has been saved by this work because it is only necessary for the management to focus on all the critical factors rather than focusing the factors in the order of their importance. After gathering information from the contractor firms the result can be compiled in the form of quantitative information and the critical areas can be identified will save lot of money/efforts. Especially for the developing organizations that are new in the business these identified factors can help them to reorganize their priorities and actions in order to stay competitive and successful in the industry.

Chapter 3

RESEARCH METHODOLOGY

3.1   INTRODUCTION

This research is based on exploring the specific areas/critical factors, which may increase the chances/probability of contractor's success in building construction of Pakistan. First target is of exploring these areas and then focussing on description/explanation and analysis of these, so that then can be prioritised according to their importance. After exploring these areas/factors thorough literature review has been carried out, discussions/interviews have been conducted of owners, project managers, site engineers who had the experience of mega construction projects, primarily focussing on how to improve chances of success of contractors in terms of procuring, quality construction, and timely delivery and generating reasonable profit from this business. Engineers working on planning/scheduling of construction projects were also targeted in order to learn what aspects are necessary to save time and increase in cost of the project, which ultimately leads to the success of contractor.

In the next phase is developing the questionnaire basing on the experience of the professionals and conducting survey by going through various construction projects and interviewing professionals involving owners, project managers and site engineers. The interviews were kept in consonant with the questionnaire and outputs were recorded accordingly.

In the final stage compilation and analysis of the data obtained from the survey is carried out in order to find out the areas which require more focus in order to get successful output from the business of building construction in Pakistan.

3.2   RESEARCH DESIGN

Research objectives have been established in chapter 1. The methods for achieving these objectives are discussed here. The research methods used in social sciences are surveys, analysis, case studies and previous studies conducted on the same subject matter. Moreover, method appropriate for a particular research depends upon degree of research, targeted/focussed area and time available. While selecting an appropriate method for research it is mandatory to consider the links between data collection and its analysis, as well as addressing the main objectives and the results.

In this research questionnaire survey is administered as the most appropriate method for study. The research work carried out in order to reach the objectives is conducted in three phases. Figure 3.1 indicates the research methodology adopted to carry out this research.

3.2.1 Exploratory Phase

- Searching for literature through various resources which include internet, construction management journals, researchers who worked upon this aspect in different parts of world construction industry.
- Studying the prospect of Pakistan construction industry professional by interviewing them in order to sort out the factors found important in the literature review.
- Developing the questionnaire focussed towards the qualitative research.
- Carrying out pilot survey based on the developed questionnaire by going to selected construction professionals to find out the acceptability of these factors in the field.
- Carrying out the amendments in the questionnaire based on the pilot survey/initial feedback.

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┌─────────────────────────────────────┐
│       Define Research Problem        │
└─────────────────────────────────────┘

┌─────────────────────────────────────┐
│          Exploratory Phase           │
│   • Comprehensive literature review  │
│   • Exploratory survey in the field  │
│   • Interviewing the experts         │
│   • Developing questionnaire         │
│   • Pilot survey                     │
└─────────────────────────────────────┘
                                        ┌──────────────────┐
                                        │ Questionnaire    │
                                        │ Survey        &  │
                                        │ Interviews       │
                                        └──────────────────┘
┌─────────────────────────────────────┐
│      Execution of Field Survey       │
│   • Finalizing questionnaire         │
│   • Conducting survey of targeted    │
│     zone                             │
│   • Compiling survey results         │
└─────────────────────────────────────┘
                                        ┌──────────────────┐
                                        │ Data Analysis    │
                                        │ using SPSS-17    │
                                        └──────────────────┘
┌─────────────────────────────────────┐
│         Analysis of the Data         │
│   • Devise analysis strategy         │
│   • Developing hypothesis            │
│   • Study the qualitative analysis   │
│     techniques                       │
└─────────────────────────────────────┘

┌─────────────────────────────────────┐
│        Results and Conclusions       │
│   • Results developed based on       │
│     analysis                         │
│   • Conclusions are made basing on   │
│     results                          │
└─────────────────────────────────────┘

┌─────────────────────────────────────┐
│           Feedback/Report            │
│   • Results are communicated back to │
│     the industry                     │
└─────────────────────────────────────┘
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Figure 3.1 Research methodology adopted.

3.2.2   Survey/Feedback

- Comparatively large construction sites are targeted for research because small construction sites do not possess requisite educated staff, resources, professionals and methodologies which they use are very old. Therefore contractors who are registered as no limit contractors with Pakistan engineering council are targeted as they are involved in mega construction projects.

- Approaching all the contractors of CA category no limit was not possible because of lack of time and resources, therefore contractors working in capital city of Islamabad and province of Punjab were focussed because it form a major representation of this category.

- Interviews and discussions will be carried out with the professionals of these organisations basing on the developed questionnaire and grades will be awarded accordingly to these factors.

- Compilation of the data is carried out in order to move to the next phase.

3.2.3   Analysis of the Data

- After compiling the data analysis will be carried out by statistical software

- Hypothesis will be developed prior to the analysis by SPSS software

- Qualitative analysis aspects are focussed

3.2.4   Results and Conclusions

- Basing on the statistical outputs results are developed in the final phase

- Keeping in view the results generated, conclusions are developed

- Communicating back to the professionals/contractors working in the industry about the results configured through this work

3.3   SURVEY SAMPLE

The purpose of statistics is to have summary about some characteristics of the population through sampling. For the results to be accurate sampling should be true representative of population. There are several ways of sampling depending upon the attributes of the population these include judgemental, random and non-random sampling. In judgemental sampling sample selection is totally depends upon researcher's judgement, without using statistical analysis/sampling techniques. This type is prone to give bias results, so its use should be limited and reasons for its use is required to be mentioned. Random sampling technique is used when there is no major variation in population structure. Random number table or software programmes are used to select random samples with each of them having equal chances of selection. Talking of non-random sampling techniques we focus on entire population or selected areas of population. The results of this technique are considered more reliable. Non random sampling technique is adapted to carry out this research.

In Pakistan major construction zones are big cities like Karachi, Lahore Rawalpindi/Islamabad. It is not possible to visit all the construction sites in Pakistan due to lack of resources, time and cost element. Therefore class A no limit contractors in Rawalpindi/Islamabad and Punjab areas are targeted for this research. Total of 78 no limit contractors are registered with Pakistan engineering council in the targeted zone. 69 Out of these 78 construction firms were approached and professionals of these organizations were interviewed/questioned. Area sampling technique is utilized due to large geographical area in focus.

Various researchers have given/presented different theories about the sample size with respect to the validity of results, like 30 is the minimum sample size as proposed (Economist 2003). Saunders et el.(2009) also limits the sample size to 30 to achieve reliable results. Sample size of 30 or more samples gives results as close to the normal distribution. Wilson (2010) gave a formula to evaluate sample size from the population size.

$$n = N / [1 + N(e)^2]$$

Where,

n = Size of the Sample

N = Size of Population

e = Precision

Population in our case is 78 and keeping precision level +- 5 %, the sample size we require is 65. 69 firms were approached during our survey; therefore sample size is well representing the population. Greater sample size increases the reliability of results as the results of greater sample size are inclined towards normal distribution.

Saunders et al. (2009) gave consideration to some other factors besides sample size i.e. Means available for obtaining information, time and skill of the researcher, method adopted for obtaining informal data, Cost element and the resources available at the hand of researcher. After finalizing the questionnaire and sample size to be targeted the research works enter into the next phase.

3.4   DESIGN OF SURVEY

The importance of the design of questionnaire for effective results of survey has been considered by number of researchers (Griffith, 2004). A well designed questionnaire contains questions that a respondent can tackle and answer without putting much of an effort while maintain interest, subject matter and without wasting sufficient time. Response Rate is influenced by number of reasons such as questionnaire size, dimensions, printing quality, paper colour, use of stamps and envelope used to mail the questionnaire. Moreover researchers are in favour of mixed mode surveys in order to obtain better response rate. In this study mixed mode survey is adopted, respondent were interviewed basing on the designed questionnaire. There are many ways to create interest of the correspondent, for example provision of rewards like monitory or material incentives, asking for an advice, making questionnaire interesting and offer a summary.

In this study respondents are given importance by exhibiting them that they are the part of a carefully selected sample as per their experience and professionalism. Significance of this study has been highlighted in the form of covering letter to the respondent. Questionnaire is having five point likert scale questions which require lesser time for the respondent to answer. Structure is providing the vertical flow of questions groped under various sections. NUST logo is utilised on the covering letter to attract the respondent. Respondents are also ensured about the confidentiality of information they will provide.

To increase the reliability of the survey thorough study of the work executed in this field has been studied. Prior to finalizing the questionnaire comprehensive literature review has been carried out and a questionnaire is drafted. Then pilot survey is been conducted with selected experts and academic researchers is carried out, that lead to few modifications in the questionnaire. It improved the reliability and validity of questionnaire.

3.5   CONDUCT OF SURVEY

After finalization of questionnaire and the pilot survey, thought was given which way should be adopted in order to conduct the survey. During the pilot survey, problems faced were that respondents in most of the cases were not very much in knowledge of project management techniques and procedures, beside that a need was felt to give them the preview of questions framed in order to get the right output. Pakistan's construction industry is still in a way of adopting modern techniques and requisite staff on sites.

Therefore technique adopted was through personal interviews and grading the questions according to the perception of the person interviewed. There were firms who have not hired project managers with desired qualification. Questions were explained to them in simple language which they understand.

The targeted area was divided into different zones i.e. capital city, Rawalpindi, Lahore, Faisalabad and Multan, and approximately 2 hours was given for each interview. The responses vary because interviews were conducted

with variety of official's i.e. owners, consultants, project manager and site engineer etc of these firms. The identities of the persons interviewed were kept anonymous because of the confidentiality of information. Smith (1998) says confidentiality is a key for getting desired output and correct results.

Total of 78 firms were approached in the target area, 73 responses were obtained out of which 69 responses were valid and 4 responses were regarded as null and void because of lack of education and experience of staff of these firms. Statistics of responses are displayed in Figure 3.2.
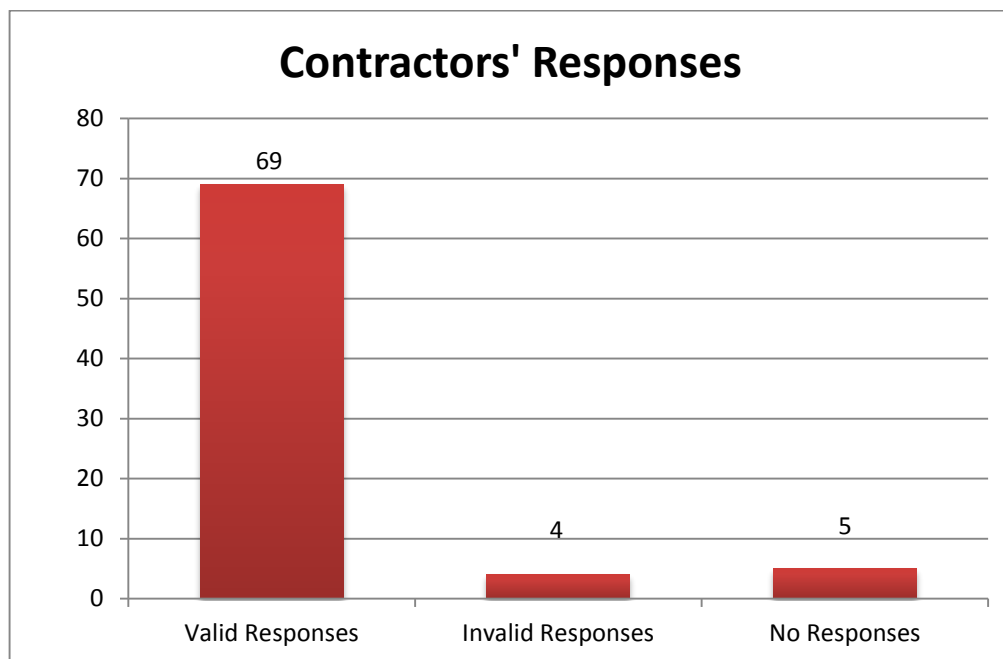
Figure 3.2 Statistics of interview responses.

A covering letter was forwarded to these firms displaying the aim and intention of this research duly signed by the head of the department in order to develop the meaningful interest of these firms and question paper developed for this research was also attached with it (appendix 3).

3.6   DATA ANALYSIS TECHNIQUES

3.6.1   Likert Scale

The likert scale was used in the questionnaire in order to quantify the importance given by the respondents. The maximum response for the variable weighs 5 and move towards minimum that is 1.

3.6.2   Feeding of the Data

The second stage is feeding of the data into the SPSS 17 and checking for any missing values. Input obtained from the respondents were assigned was entered as dependent variable and critical success factors will be studied with respect to these. After conformance about absence of missing values, we will proceed to carry out descriptive statistics about the data.

3.6.3   Hypothesis Testing

It is an important phase of statistical inference and it is a procedure which enables us to decide whether the assumption made about the population parameter is true or false based on the information obtained about the sample data. Such a statement which may or may not be true is called as statistical hypothesis. Hypothesis is regarded as true when assumption made from the sample data is true otherwise it is rejected.

3.6.4   Null Hypothesis and Alternate Hypothesis

Null hypothesis is the one which is to be tested for possible rejection under the assumption that it is true and symbolizes as Ho. The hypothesis which is adopted other than null hypothesis is known as alternate hypothesis.

3.6.5   Significance Level and Test of Significance

Significance level is the probability used as standard for rejecting a null hypothesis Ho, when Ho is assumed to be true. Test of significance is a rule or procedure adopted by which sample results are used to accept or reject the null hypothesis.

3.6.6 Test for Normality

The study follows usual level of significance α = 0.05. the thorough test of normality require the data test of 2000 elements or less is presented by Shaprio-Wilk test. This test is performed to check that the data is distributed normally or not. To see the data to be normally distributed the significant value should be non-significant (i.e. it should be larger than .05). For the data set of more than 2000 elements Kolmogorov-Smirnov test is more suitable. Hence we will be analysing the results of Shaprio-Wilk test for this study. In our hypothesis we have made an assumption if the significance value of this test is greater than 0.05 then we will follow parametric test otherwise non parametric tests will be followed.

3.6.7 Ranking Test

This test is conducted to analyse and identify the ranking among the critical success factor, it is also known as Friedman test or ranking of means test. This test is a Non- Parametric tests are carried out for the data that is measured on nominal and ordinal (ranked) scales. These tests are suitable for small samples and when our data don't meet the assumptions of parametric technique.

3.6.8 Spearman-Rho Test

This test is conducted to analyse and identify the strength of relationship among all the variables. Two tailed relationship is worked out through this test which means strong relationship values closer to +1 whereas values nearer to -1 or zero indicate no relationship at all among the variables.

3.7 SUMMARY

This research uses multiple or mixed research methods. Questionnaire survey is adopted as the main research instrument. In this chapter, the research method, design and sampling techniques are discussed. Above discourse provides clear understanding of the research methodology used.

Chapter 4

RESULTS, ANALYSIS AND DISCUSSION

4.1 INTRODUCTION

Before doing any detail statistical analysis, we will be first conducting descriptive statistics of nine independent variables and one dependent variable. Table 4.1 below gives us the results of descriptive statistics of these variables. Mean value of results of these variables ranges from3.46 to 4.27 which speak of importance of these variables accordingly. Standard deviation gives us the range of spread of the data which in this case varies from .18 to .36. Descriptive includes information of distribution of scores on continuous variables i.e. skewness and kurtosis. Skewness variables in this case are having more negative values which shows clustering of values towards higher side, however there variables which shows positive skewness showing clustering of values on lower side.

Table 4.1 Descriptive Statistics of Various CSFs

	N	Mean	Std. Deviation	Variance	Skewness	Kurtosis
Project Management	69	3.9114	.18896	.036	-.394	-.344
Organization Structure	69	3.7766	.19094	.036	-.322	-.505
Organization Resources	69	4.0331	.27077	.073	-.131	-.320
Competitive Strategy	69	4.3768	.24489	.060	.173	-.555
Relationship	69	3.9478	.30994	.096	-.110	-.628
Bidding	69	4.2754	.31806	.101	-.058	-.301
Marketing	69	4.1522	.25802	.067	.112	-.538
Technology	69	3.4686	.36746	.135	.009	-.035
External environment Factors	69	3.4710	.24829	.062	.424	.484
Valid N (list wise)	69					

Kurtosis showing negative values indicates distribution that is relatively flat, where as positive value indicates the distribution in the form of clusters, forming peakedness on the curve. Value of skewness and kurtosis is not equal to zero, showing lack of normality in the data (Kanji 2006; Pallant 2007).

4.1.1 Test for Outliers

Data point lie out on the extremes are potential outliers. These values may affect the original results, therefore in most of the SPSS tests 5% of the extreme values are cut and mean is taken, if the mean of the original data and mean of the data without 5% outliers (trimmed mean) have big difference then we may have to investigate further (Pallant 2007). In our case here the difference between original data mean and the trimmed mean is very small therefore outliers in our case do not affect our test results (Appendix4).

4.1.2 Checking Normality of the Data

Normality of scores of dependant variable shows a bell shaped curve with larger frequency of scores in the centre and smaller one on the edges, test is conducted for Kolomogorov-Smirnov and Shapiro-Wilk tests. Kolomogorov-Smirnov test is applicable for data were the sample size N is greater than 2000 (Park 2008). Therefore we will be working on the results of Shapiro-Wilk test. The hypothesis adopted for the test of normality is:

H_0 = Scores of data are normally distributed

H_1 = Scores of data are not normally distributed

Shapiro-Wilk test configure that if significant value for the test is greater than .05 then the scores are normally distributed but by seeing the table above it is obvious that the significant value is not normally distributed except two variables. It is obvious that majority of the variables are not following normal distribution therefore H_0 is rejected and alternate hypothesis H_1 is accepted. By seeing the results in Table 4.2 of normality test it is obvious that the scores of dependant variable are not normally distributed, hence we will be adopting non parametric tests for our further analysis of the data.

Table 4.2 Test Results of Normality Test

	Shapiro-Wilk		
	Statistic	df	Sig
Project Management	.970	69	.092
Organization Structure	.959	69	.023
Organization Resources	.968	69	.078
Competitive Strategy	.899	69	.000
Relationship	.954	69	.012
Bidding	.903	69	.000
Marketing	.906	69	.000
Technology	.929	69	.001
External environment Factors	.903	69	.000

4.1.3   Correlation Test

Correlation is carried out to identify the strength among different variables. Its value varies from -1 to +1 which indicates strong negative means less interdependency among the variables where as strong positive relation indicates how variables are interdependent in order to achieve the final output of results. However significant value of 0 indicates no relationship among the variables. Spearman rho test is carried out to identify the strength of relationship among the variables. The results of the Spearman's Rho Correlation Test are attached as Appendix 5.

4.1.4   Sample and its Configuration

The sample size targeted in this research study is 69; there are no missing values in our scores. In order to ascertain the strength of relationship between variables, diagnostic plots including scatter plots were drawn. By seeing its results it was obvious that the outliers needed to be trimmed off or otherwise.

4.1.5   Strength of the Relationship

By analysing the variables by spearman rho test in SPSS 17, the results of spearman rho correlation test significant level depicts a very strong relationship between all the variables except marketing has relatively weak relationship with

other variables which highlights that marketing is not dependent on other critical success factors. It also indicates that marketing is not very strong critical success factor in the construction industry of Pakistan. In spearman rho test significant value of -1 indicates independent of relationship, whereas +1 indicates very strong relationship and 0 indicates no relationship at all among the variables.

4.1.6 Assessment of Significance Level

H_0 or null hypothesis in this case is that the significant value is 0 in two tailed, which means success factors are not related. Alternate hypothesis (H_1) says that success factors have significant relationship with each other. By two tailed relationship means, considering strong relationship value nearer to +1, very weak relationship by having values nearer -1 and by the value of 0 no relationship at all. If there is a requirement to check or fix one value then two tailed test is conducted (Chaudhary and Kamal 1999). Results depict significant value $p < .01$ indicating high significant value and strong relationship among the variables. Therefore alternate hypothesis (H_1) is accepted.

4.1.7 Friedman Test

The Friedman Test is a non-parametric test and is conducted for ranking of mean of different variables under different conditions (Pallant 2007).

H_0 = the variables have the same mean

H_1= the variables have different mean

It is an alternate test of repeated measures analysis of variance. Test results indicate significant value < .0005. Test of flanks shows there is significant difference in mean ranking figures. Competitive strategy is regarded as the strongest success factor in the field of building construction for contractors whereas external environmental factors have the lowest mean value indicating the weakest among the success factors. H_0 is rejected as the variables possess different mean value. Results of Friedman test are shown in Table 4.3.

Table 4.3 Friedman Tests-Mean Ranking

Description	Mean Rank
Project Management	4.80
Organization Structure	3.41
Organization Resources	5.80
Competitive Strategy	7.90
Relationship	5.09
Bidding	7.38
Marketing	6.45
Technology	2.20
External environment Factors	1.96

N	69
Chi-square	341.233
d_f	8
Asymp. Sig.	.000

4.2   DESCRIPTIVE STATISTICAL ANALYSIS

Descriptive statistics include mean, standard deviation, skewness and kurtosis (Pallant 2007). It helps describing the characteristics of the sample, to check your variable against any violation of assumption and is used to address any specific research question. Range of means and standard deviation of variables become handy with this test. Preliminary analysis is univariate and supported by diagrams. Preliminary analysis depicts

- Normal distribution is not followed by the scores of variables, it is skewed and kurtosis shows lack of symmetry in the scores of the variables.

- Outliers do not affect the data/scores.

- Very strong correlation exists among the variables.

- By seeing the varying mean value of variables you can easily rank them according to the degree of their importance.

- Competitive strategy being on the top and technology we can see at the bottom of the success factors by seeing their mean values.

4.2.1   Project Management

Project management variable as CSF have several indicators, which include the use of project management techniques, quality management, cost management, contract management, logistic and supply chain management, dispute resolving skills,time mmanagement, site management, risk identification and allocation, project managers experience, knowledge and expertise on law, environmental management,project insurance, claim skills,health and safety management, resource management,documentation and record keeping andplant management.Management peoples were asked to give rating to this factor mostly rated this factor towards higher side. Response was above 90 %, which clearly signifies its importance. Details of the responses are given in Table 4.4.

The firms have the opinion that the project manager's experience, cost management, quality management, and experience in managing the site are the major indicators for contactors to select the right manager to run the project. From the table above it is obvious that all these indicators play important role in the project management success for the contractor.Organizing the project and getting the results is not one man show it's the teamwork. Unfortunately contractors in Pakistan are mostly uneducated and they were unable to understand the importance of project management team. But now the complex projects in the field simply demands the team work of project management team to run the system. Professional organisations in the field are saving time, resources and cost by utilizing these management tools in their organizations. The results are displayed in the Figure 4.1.

Table 4.4 Perception of Project Management Indicators

Project management	Use of project management techniques	Quality management	Cost management	Contract management	Logistic and supply chain management	Dispute resolving skills	Time management	Site management	Risk identification and allocation	Project managers experience	Knowledge and expertise on law	Environmental management	Project insurance	Claim skills	Health and safety management	Resource management	Documentation and record keeping	Plant management
Strongly Disagree	0	0	0	0	0	0	0	1.4	0	0	4.3	0	1.4	0	0	0	0	0
Disagree	1.4	0	0	0	0	0	0	0	0	0	21.7	0	37.7	0	0	0	0	0
Neutral	44.9	2.9	1.4	8.7	15.9	7.2	17.4	5.8	33.3		31.9	20.3	52.2	20.3	43.5	7.2	21.7	30.4
Agree	50.7	56.5	55.1	53.6	62.3	68.1	63.8	52.2	58.0	56.5	42.0	68.1	8.7	68.1	56.5	62.3	73.9	65.2
Strongly Agree	2.9	40.6	43.5	37.7	21.7	24.6	17.4	40.6	8.7	43.5		11.6		11.6		30.4	4.3	4.3

By seeing the data above in the table it is obvious that use of project management techniques are not very common in the Pakistan construction industry and professionals are prone to conventional methods of managing the projects. More emphasis is given to quality and cost management in the construction projects. Process of risk identification and allocation is new in our industry and it requires sufficient work to get recognition in the field. Similarly importance of health and safety issues at site is new to our industry and will be requiring time to get mature in the field. Existence of insurance policies in the industry need to be introduced in our industry however project manager's experience is considered as key to get successful in the field.
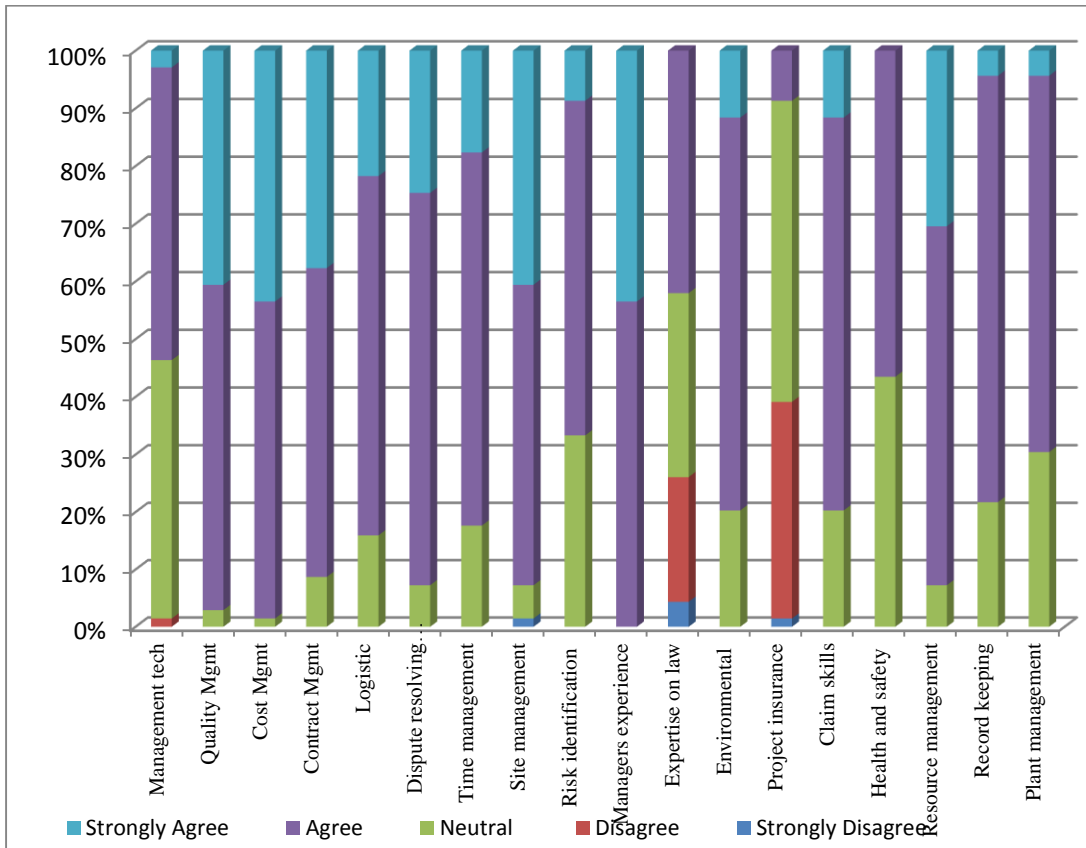
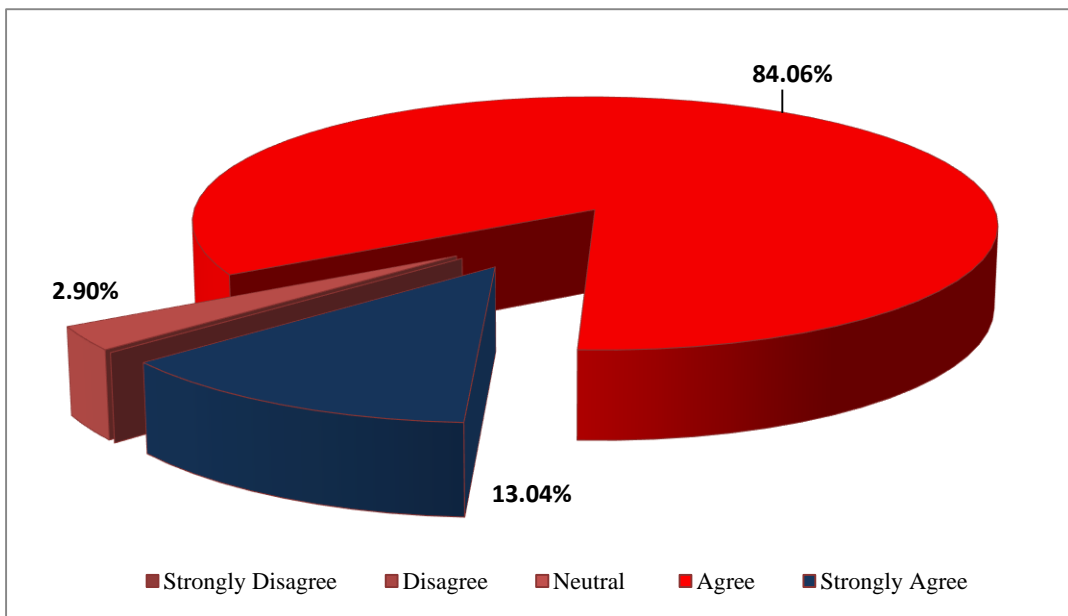**Figure 4.1** Percentage perceptions of project management indicators.

Figure 4.2 Percentage of mean perception of project management indicators.

The pie chart in Figure 4.2 highlights the importance of this variable in the eyes of industry professionals. This shows the overall perception of the firms for project management factor. It is obvious from the results that indicators like health and safety management, knowledge and expertise on law and project insurance are the indicators which lack practical application in construction industry. One important aspect needed to be highlighted here that use of project management techniques is not given due importance in field. Majority of contractors are not seems to be interested in application of these techniques mostly depends on old traditional techniques.There is the need in our industry that importance of project management tools and team should be realized in the minds of old contractors through seminars, comparison of outputs by conventional method and scientific way of managing the projects which will help in increasing their probability of success.

4.2.2   Organization Structure

Organization structure is the foundation of any organization which clearly indicates its strength. The organization structure normally varies from project to project. The perception generally says that communication and coordination among the functional departments is the most important indicator showing the strength of any organization structure. Suitability of organization structure and clearly defined and allocated functions for different departments are the other indicators which contractor perceives to be the important one. Organization structure now has taken the modern tool to implement difficult task in a smooth way. There are hardly 25% of the firms, which have due concerned about organization structure and mostly working on construction site based organization which indicates lack of professionalism on their part.Respondents disagree for giving credit to indicators like with firm's history and its size towards successful business where as leadership, motivation and integration among the staff plays a strong role towards its success. The details of the responses and results are shown in the Table4.5.

Table 4.5 Summary of Responses of Organisation Structure

Organization structure	Leaders personality and capability	Motivation and job satisfaction	Integration between management and staff	Suitability of organization structure	Communication and coordination	Firm's history	Firm's size	Organization culture	Clearly defined and allocated functions	Company's internal environment	Selection of key personnel	Recruitment system(permanent or temporary staff)
Strongly Disagree	0	0	0	0	0	0	0	0	0	0	0	0
Disagree	0	0	0	0	0	47.8	43.5	0	0	0	0	7.2
Neutral	4.3	5.8	7.2	5.8	5.8	50.7	55.1	34.8	7.2	33.3	8.7	68.1
Agree	65.2	63.8	75.4	62.3	50.7	1.4	1.4	62.3	59.4	65.2	68.1	24.6
Strongly Agree	30.4	30.4	17.4	31.9	43.5	0	0	2.9	33.3	1.4	23.2	0
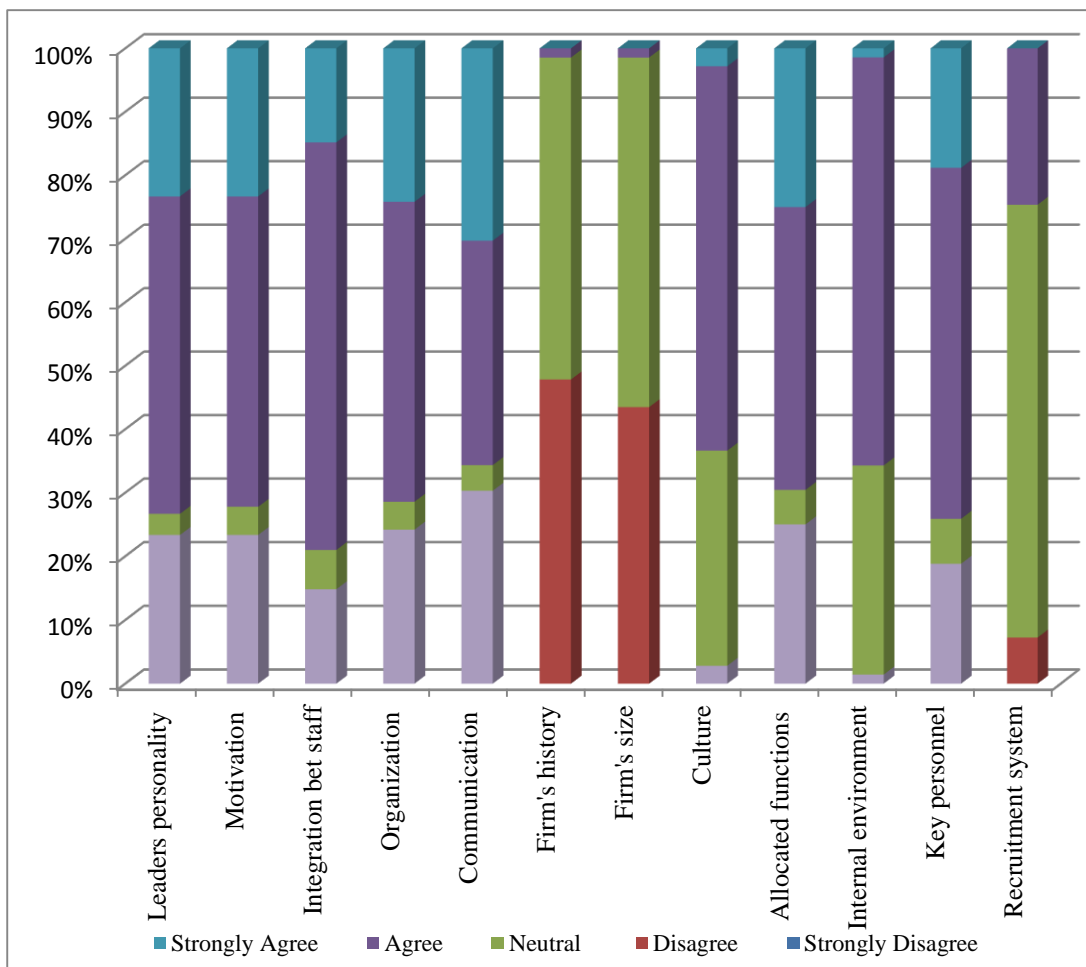
Figure 4.3 Percentage perceptions of organization structure indicators.

The pie chart in the Figure 4.4 giving the percentage of responses explains that importance of strong organizational based on lateral communication is getting its importance in the industry. About 84% of the firms realize the importance organization structure. There used to be functional organizations where vertical chain of command exists for execution of works which is not project friendly. Firm size and firm history are the indicators which have least importance for this variable.
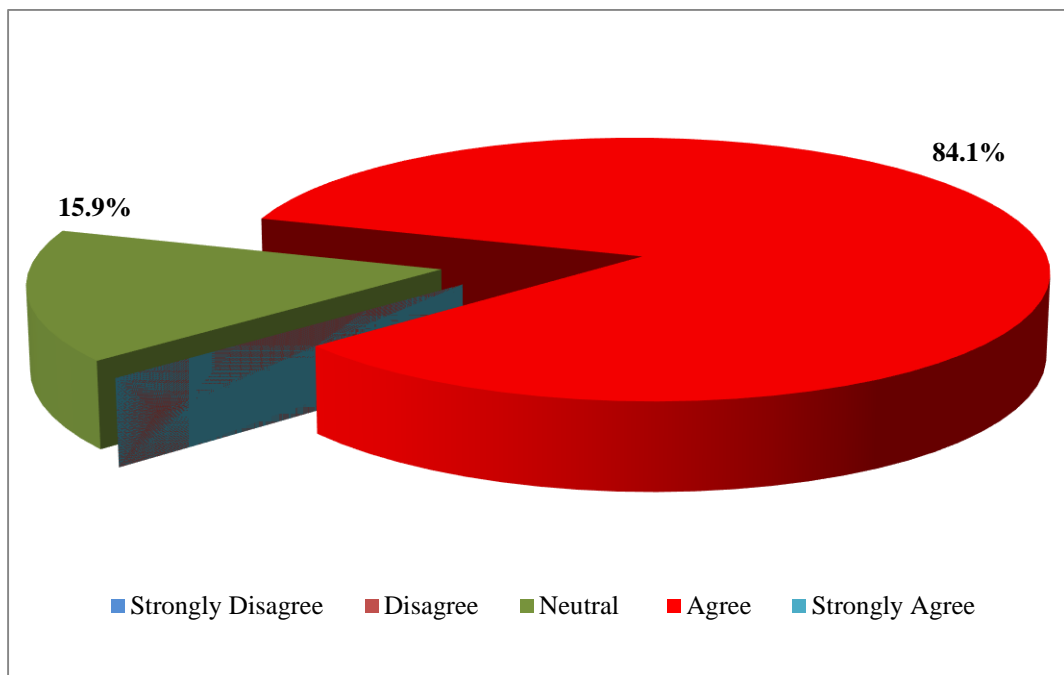
Figure 4.4 Percentage of mean perception of organization structure indicators.

4.2.3 Organization resources

Importance of organizational resources cannot be denied, organization which do not have good own resources is not capable of carrying out large independent projects and if the organization is dependent on other firms and companies for their support the projects cannot be turned out to successful. Nowadays industry is using modern techniques and test in order to carry out the construction work which demands lot of modern equipment and the firms which have their own equipment are on the strong footing in the business. Resourcefulness has always been the criteria for successfulness in the market. High rise structures demand specialized equipment, which is the need of the time that firms involved in building

construction should own such equipment. Mostly firms (above 90%)are agreedresources are major featurefor organization success. Sustainable development of human resource and financial ability to finance are the key elements of success for the contractor firms. Financial resources and own plant resources are deemed necessary key indicators for contractors success; however contractors believe that financial resources are more important than even having a plant fleet.Importance or organization resources can be seen by the perception of results in Table 4.6.

Table 4.6 Percentage Responses of Organization Resources

Organization resources	Cash flow management	Financial resources	Financial ability	Financial stability	Current capacity of human resource	Sustainable development of human resources	State of own Plant & Equipment
Strongly Disagree	0	0	0	0	0	0	0
Disagree	0	0	0	0	0	0	0
Neutral	27.5	15.9	13.0	17.4	7.2	.0	39.1
Agree	50.7	66.7	59.4	65.2	75.4	59.4	59.4
Strongly Agree	21.7	17.4	27.5	17.4	17.4	40.6	1.4

By seeing these indicators one can simply tell the strength of the company in executing large projects. Financial ability of the company is considered as the most important element in order to keep the sites alive. Financial resources available with the company to support in odd times keep the project in run. Secondly importance is given to the human resource elements especially for specialized project and it appears as the strength of the company. Whereas own plant and equipment is not considered as key to get success in the field, because sufficient plant and equipment is available in the market on hiring and contractors needs to remain worriless for their maintenance aspect. Importance of Organizational resources is obvious with the results shown in Figure 4.5.
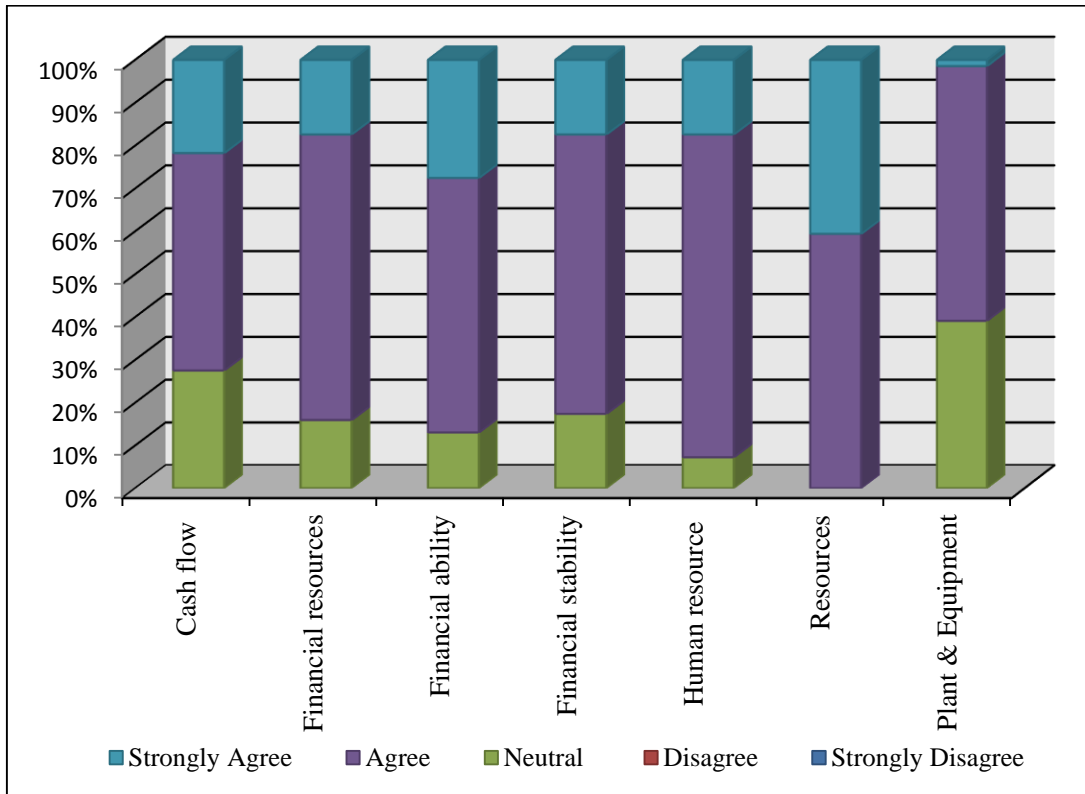
Figure 4.5 Percentage perception of the organization resource.

Pie chart clearly shows the perception of contractor about this variable of organization resources as shown in Figure 4.6.
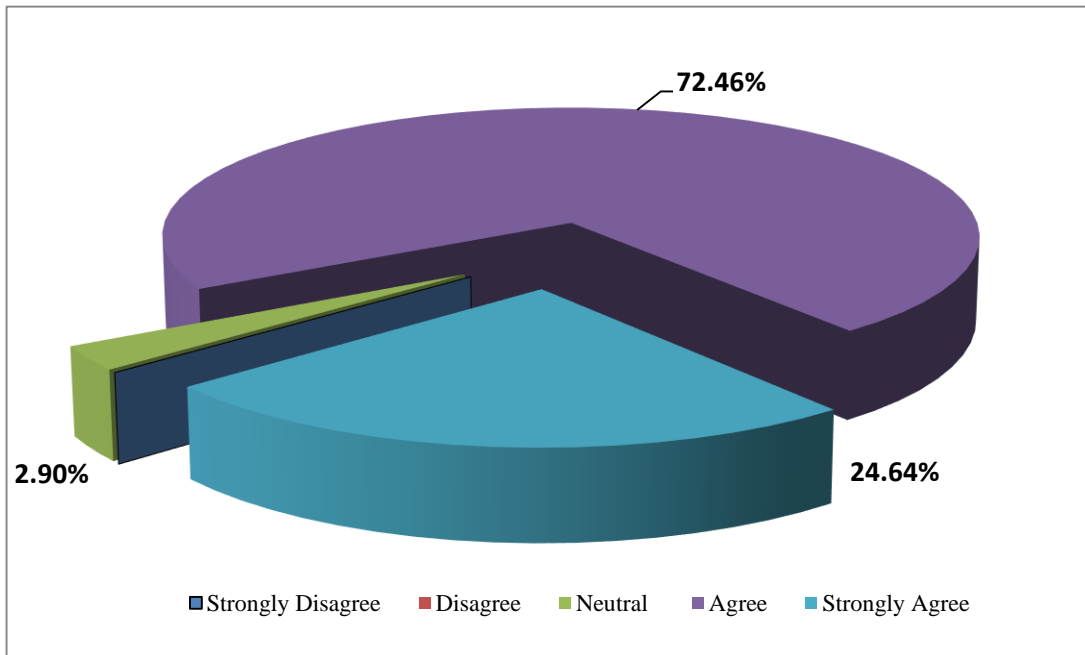
Figure 4.6 Percentage of the mean perception of organisation resources.

4.2.4   Competitive Strategy

Business and games are won with strong strategy in place. Construction is a challenging profession it has its own strength and weakness, by developing strong strategy of business in this field one can simply make construction as successful one. This is the most important variable considered for the success of any construction business. Competitive strategy is regarded as the key indicator for this variable and regarded as the core for the construction business. Every construction firm must have its own strategy matching to its own position; perception (above 93%) shows the importance of this variable. Its importance is understood at top level but need was felt that strategic decision should be clear to all the peoples in chain of command. Its importance is obvious by seeing Table 4.7 below.

Table 4.7 Responses of Perception for Competitive Strategy

Competitive Strategy	An explicit competitive strategy	Matching Strategy to a company's situation	Strategy implementation	Strategic awareness and perspective
Strongly Disagree	0	0	0	0
Disagree	0	0	0	0
Neutral	1.4	0	0	1.4
Agree	44.9	62.3	75.4	60.9
Strongly Agree	53.6	37.7	24.6	37.7

By seeing the table it is obvious that strategy to run the business is of utmost importance for the contractor and strategy without its implementation is considered as not having it. Firms need to have strategy about how to acquire business and how to stay successful in the market.

Graphical representation of the overall view of Competitive Strategy can be seen in Figure 4.7.
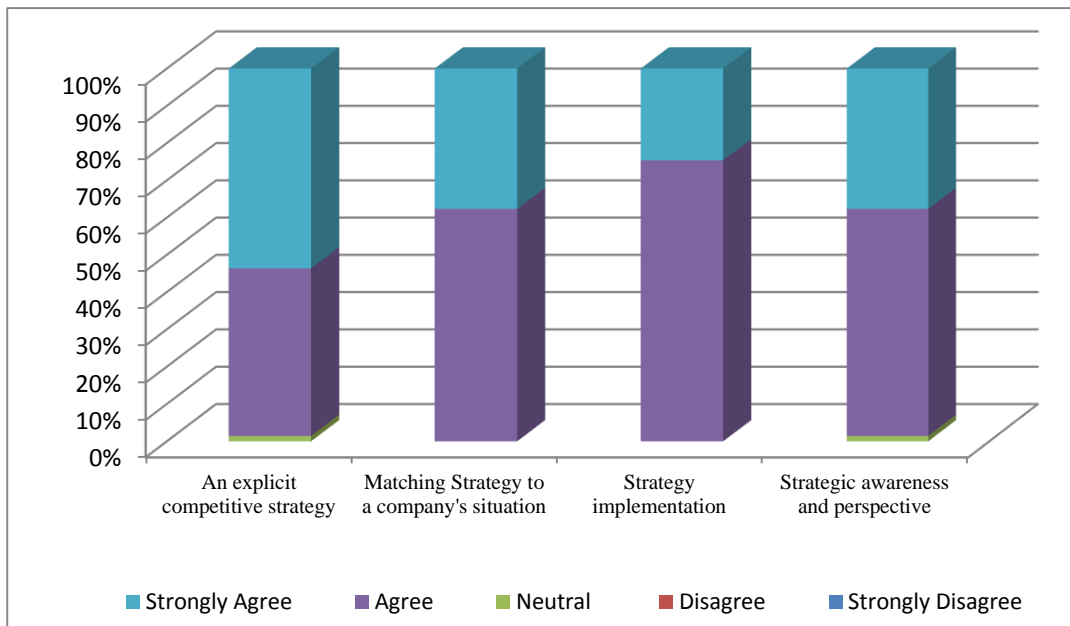
Figure 4.7 Percentage of the competitive strategy indicators.

By seeing the pie chart in Figure 4.8 it is obvious that this factor is widely accepted by the professionals.Major trend of the contractors in this variable seems that they realize importance of strategy in planning and execution of work/projects.
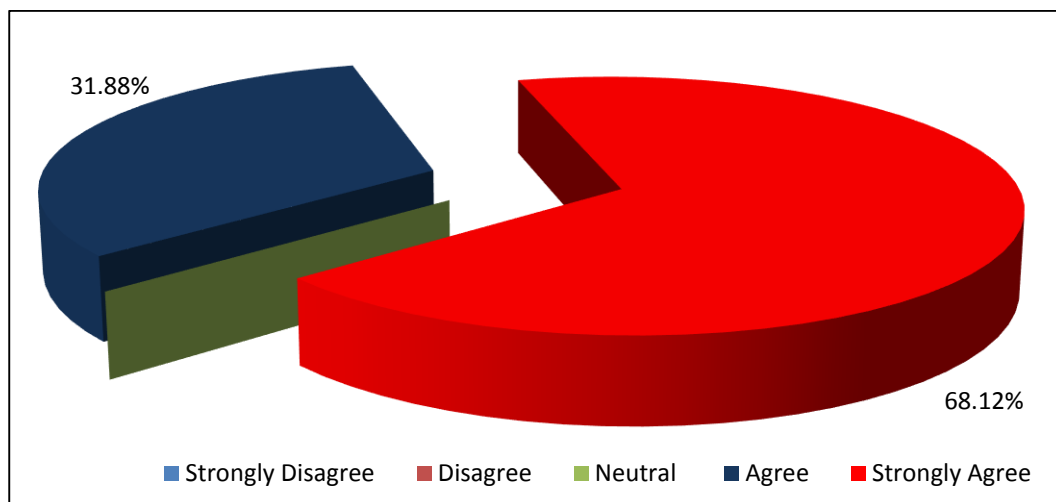
Figure 4.8 Percentage of mean of competitive stretegy.

4.2.5   Relationship

Relationship not only enhances the chances of getting more contracts/business easily, it helps also in smooth sail through in terms of finances of the projects. Perception shows relationship with government departments/officials is the prime key to acquire public/mega projects and not only this it also helps in managing the resources efficiently, this phenomenon is accepted evenly all over the world. However the firm's response shows that the relationship with owner/client is next important source of acquiring new business. The survey clearly shows that perception of relationship with public is given a lower emphasis for achievement of this variable of contractor's success. Summary of the responses can be understood by seeing the Table 4.8.

Table 4.8 Percentage of Responses of Relationship indicators

Relationship	Relationship with client and owners	Relationship with subcontractors and suppliers	Relationship with departments	Relationship with designers and consultants	Relationship with public
Strongly Disagree	0	0	0	0	0
Disagree	0	0	0	8.7	17.4
Neutral	2.9	14.5	0	24.6	40.6
Agree	66.7	62.3	58.0	53.6	42.0
Strongly Agree	30.4	23.2	42.0	13.0	0

Indicators of variable relationship are strongly accepted in construction industry of Pakistan.The overview of the comparison for importance of indicators of variable relationship is shown below in Figure and pie chart in Figure 4.10 indicates the percentage of responses.
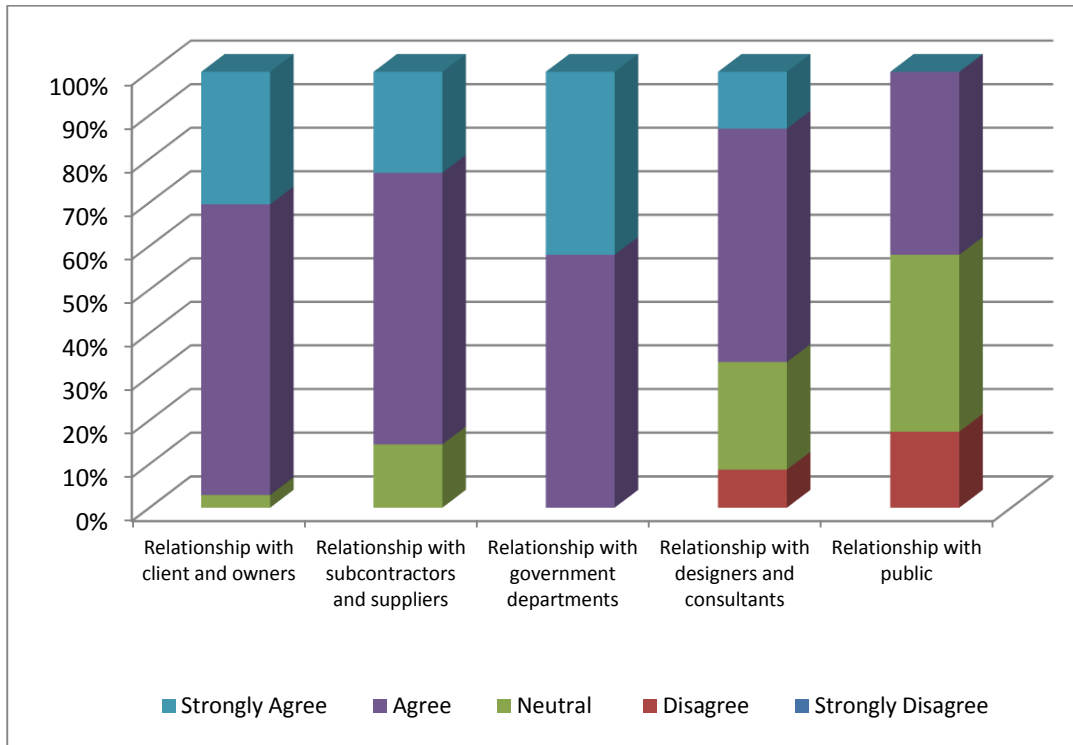
Figure 4.9 Percentage of responses for importance of indicators of relationship.
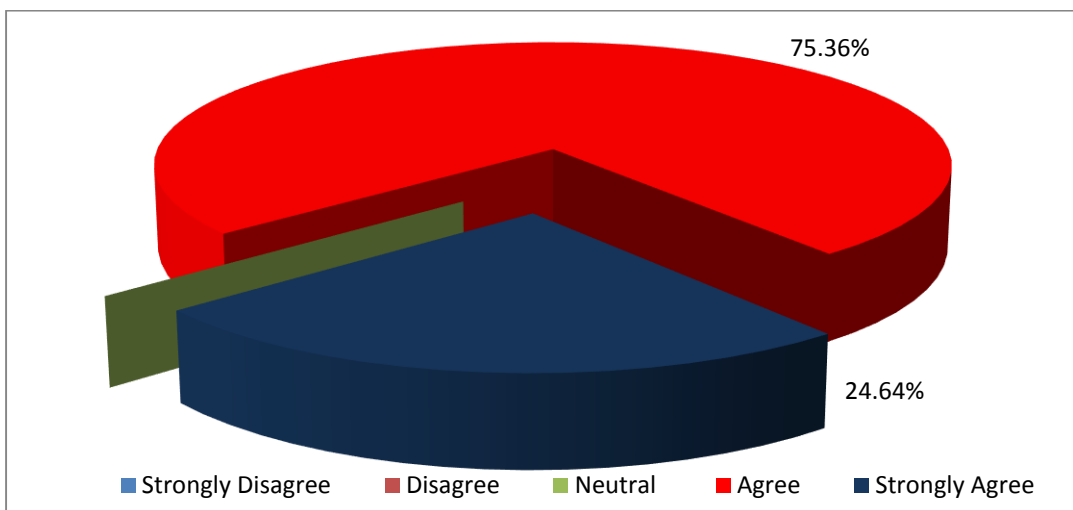
Figure 4.10 Responses for relationship.

4.2.6 Bidding

The emphasis of bidding is overwhelming in construction business. In the survey results it is clearly perceived that experience in bidding plays a vital role in winning over the contracts. Bidding strategy is given over 92% importance contractor is bound to learn this in order to be successful in this business. The

indicator of bidding resources is given relatively lower importance than the other two. Summary of responses for this factor are given in table 4.9.

Table 4.9   Percentage Responses for Indicators of Bidding

Bidding	Bidding strategy	Experience in bidding	Bidding resources
Strongly Disagree	0	0	0
Disagree	0	0	0
Neutral	0	1.4	18.8
Agree	44.9	69.6	62.3
Strongly Agree	55.1	29.0	18.8

The overview of the comparison for importance of indicators of variable relationship is shown below in Figure 4.11.

Figure 4.11 Percentage of responses for importance of indicators of bidding.

Indicators of variable bidding are strongly accepted in construction industry of Pakistan and Figure 4.12 shows percentage of responses.

39.10%

58.00%

2.90%

■Strongly Disagree   ■Disagree   ■Neutral   ■Agree   ■Strongly Agree
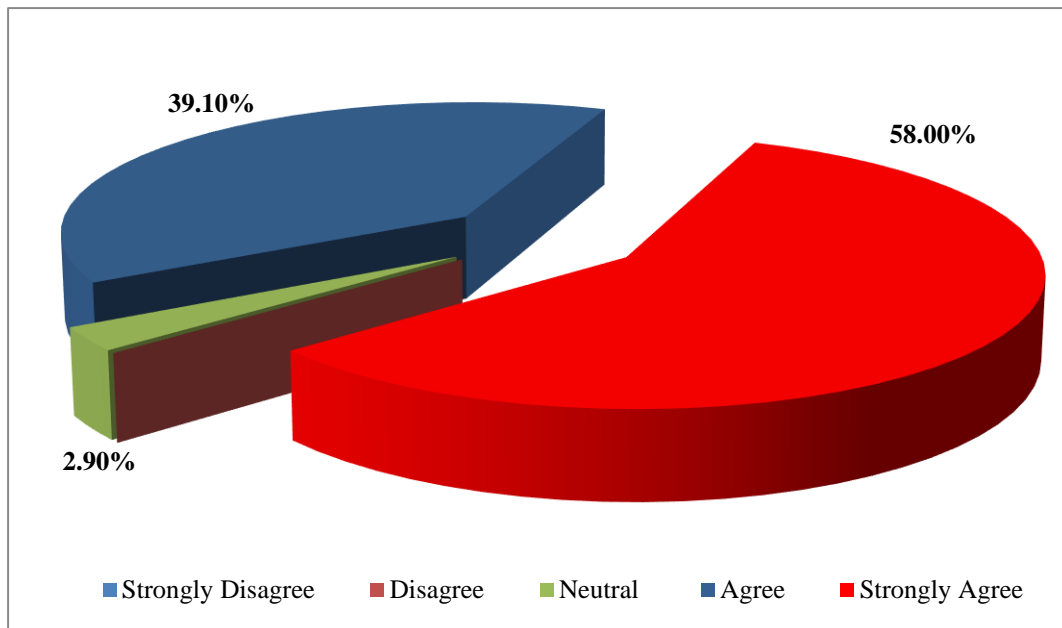
Figure 4.12 Responses for bidding.

4.2.7   Marketing

Marketing is considered as third most important variable in expanding the construction business as perceived from the survey. Marketing is an important aspect which is required to focus in order to require competitive in the market. Marketing research/planning and business coverage are two major indicators for this variable, it is perceived from the survey that one major factor for contractors success are the accomplishment of these indicators which results in the expansion of the business and ultimately contractors success. Overhead in construction business can be decreased by incorporating this factor in their business strategy. Availability of products and price information of labor, material, plants and other resources is another indicator for this variable, importance of which is accepted by 90% of the firms. The survey clearly shows that perception of variable marketing is given a higher emphasis for achievement of contractor's success. The table below shows the result of responses Table 4.10.

Table 4.10 Percentage of Responses of Marketing Indicators

Marketing	Market Research & Planning	Capability of gathering and processing information	Availability of products and price information	Business coverage
Strongly Disagree	0	0	0	0
Disagree	0	0	0	0
Neutral	26.1	7.2	8.7	.0
Agree	53.6	63.8	65.2	72.5
Strongly Agree	20.3	29.0	26.1	27.5

The overview of the comparison for importance of indicators of variable marketing is shown below in Figure 4.13.
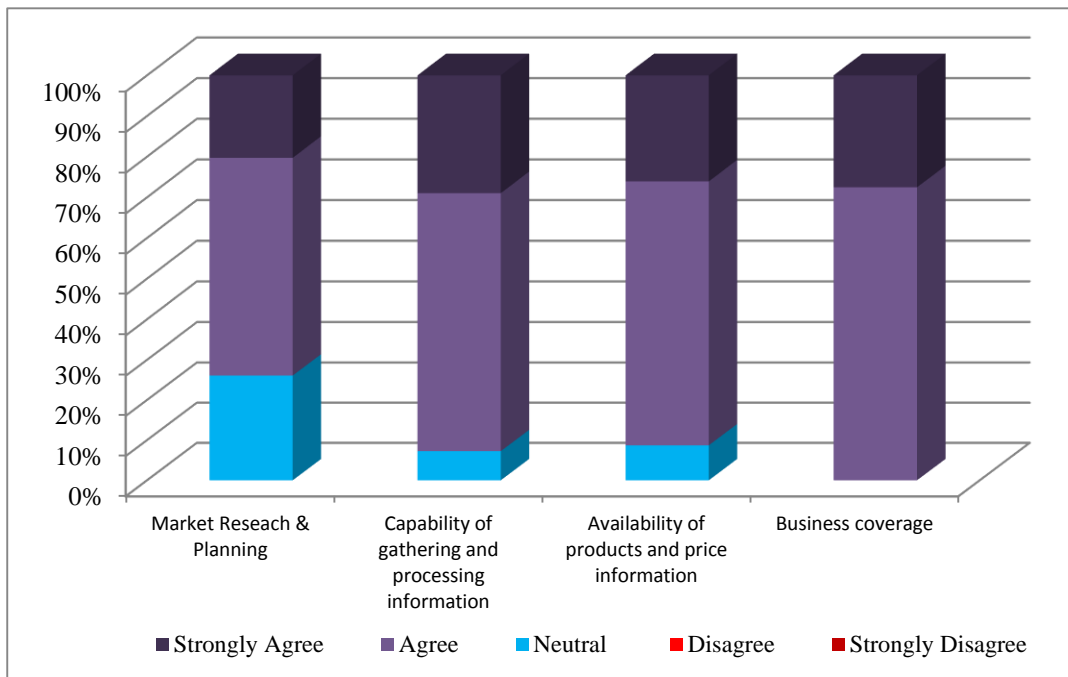
Figure 4.13 Percentages of responses for importance of indicators of marketing.

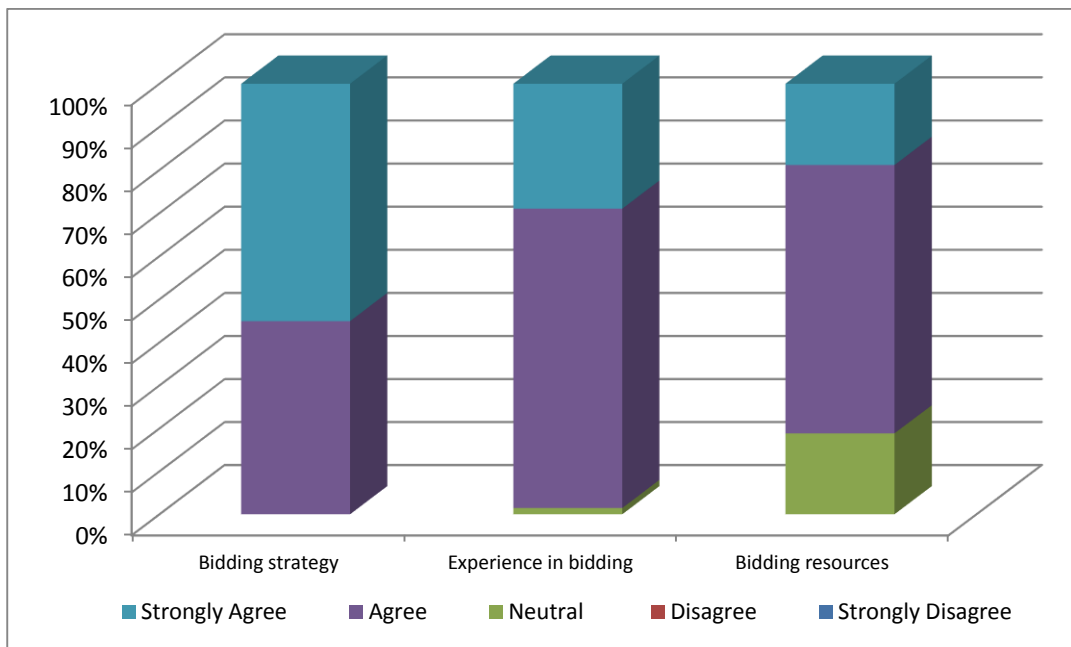Indicators of variable marketing are strongly accepted in construction industry of Pakistan and can be seen in Figure 4.14.
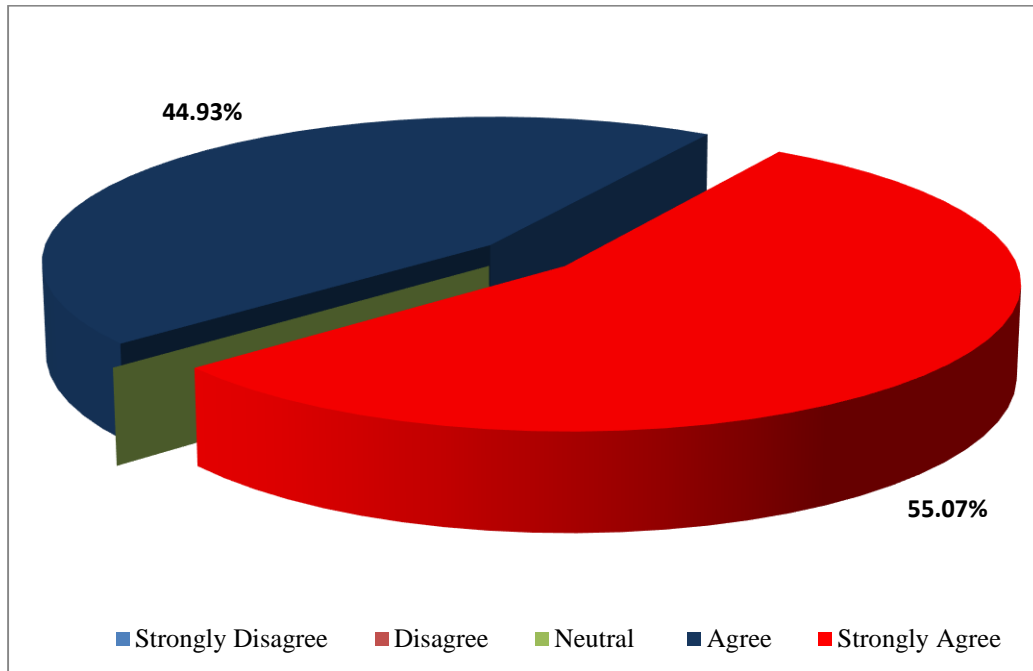
Figure 4.14 Responses for marketing.

4.2.8   Technology

Pakistan's construction industry is mostly based on uneducated contractors and projects which were there mostly in the field constitute typical structures. But now the modern era of construction have started in Pakistan as well. Number of complex structures in the way of construction in Pakistan, these structures demand peoples with sound technical knowledge and modern software's are utilized in planning and execution of different type of projects. Use of I.T. application is growing faster in the industry but we are the stage where we use just those features of the software which helps just to project the work but their real help is not being utilized in the industry. Construction firms has limited themselves to the basic software's, more than 75% of the contractor firms are using MS Project/MS Excel as their primary scheduling software's whereas primavera is also used in the industry as scheduling software, but it is not utilised to the best of its features i.e. recourse levelling. The table below expresses the importance that contractors give to the indicators of technology Table 4.11.

Table 4.11 Percentage of Response for Technology Indicators

Technology	Technology innovation ability	I.T. application	Sustainable development of technology and R&D
Strongly Disagree	0	0	0
Disagree	0	18.8	8.7
Neutral	23.2	65.2	37.7
Agree	56.5	14.5	53.6
Strongly Agree	20.3	1.4	.0

The overview of the comparison for importance of indicators of variable Technologyis shown below in figure 4.15.
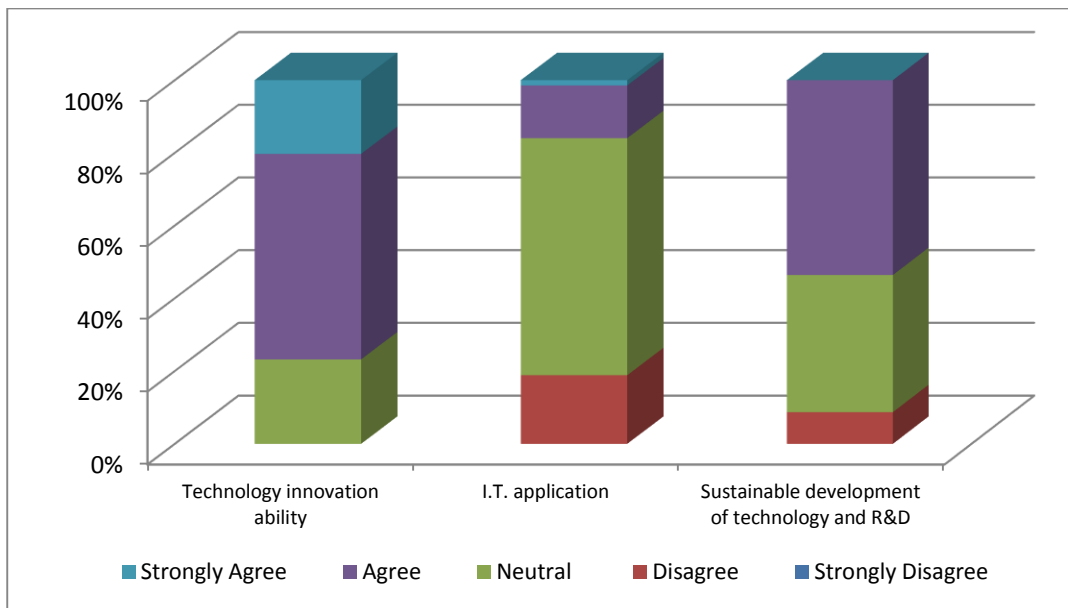
Figure 4.15 Percentage of responses for importance of indicators of technology.

Indicators of variable technology indicate fewer acceptances than other variables in the construction industry of Pakistan and can be seen in Figure 4.16.
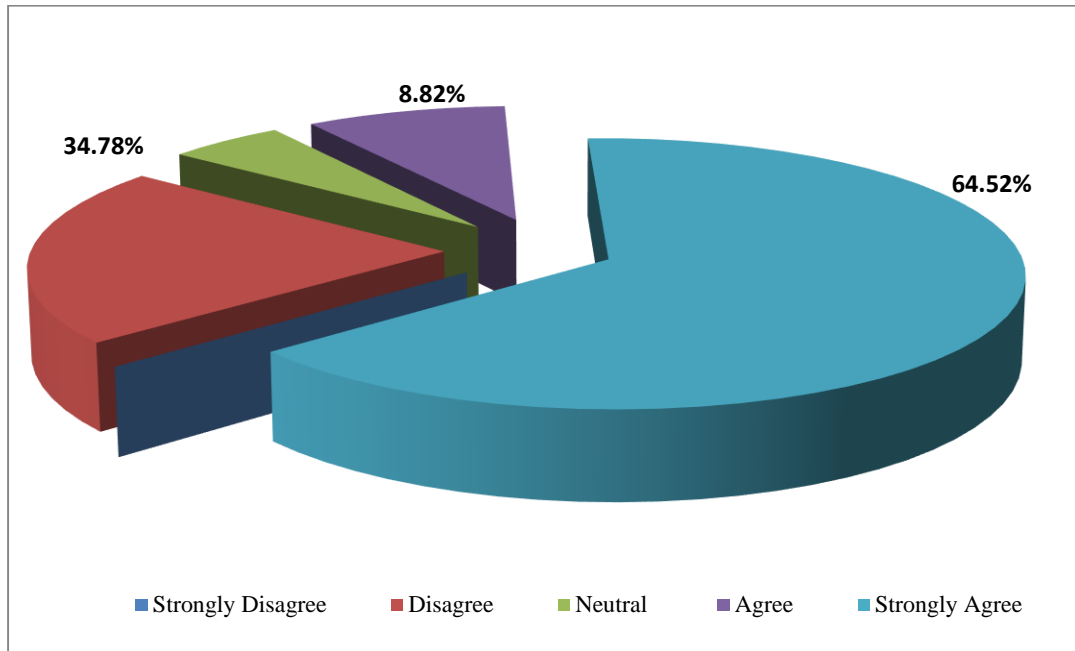
Figure 4.16 Responses for technology variable.

4.2.9   External environment factors

External environmental factors play vital impacts on construction process. Internationally where rules and regulations are implemented play strong role in execution of construction process, in Pakistan construction is declared as an industry in 1993 but rules and regulations are not still made and implemented according to Pakistan s environment. State of national economy and political environment are two major indicators for this variable, it is perceived from the data collected that these indictors do not have major impact on industry basing on fact that Pakistan's economy is in turmoil from a long time and political instability became a part of the system. Another aspect which has lot of impact is natural disasters like earthquake, floods and hurricanes but we do not include it in our study because it is very difficult to predict the impact of these disasters. Industrial relations environment is given least consideration by the respondents towards contractor success whereas political environment/situation in the country has strong impact on success of this industry. Table 4.12 below highlights importance of different indicators in the eyes of contractor.

Table 4.12 Percentage of Responses for Indicators of External Environment
Factors

External environment factors	State of national economy	Construction industry regulations in Pakistan	Political environment	Industrial relations environment
Strongly Disagree	0	0	0	0
Disagree	0	0	0	11.6
Neutral	36.2	65.2	21.7	73.9
Agree	60.9	34.8	72.5	14.5
Strongly Agree	2.9	0	5.8	.0

The overview of the comparison for importance of indicators of variable
relationship is shown below in Figure 4.17.
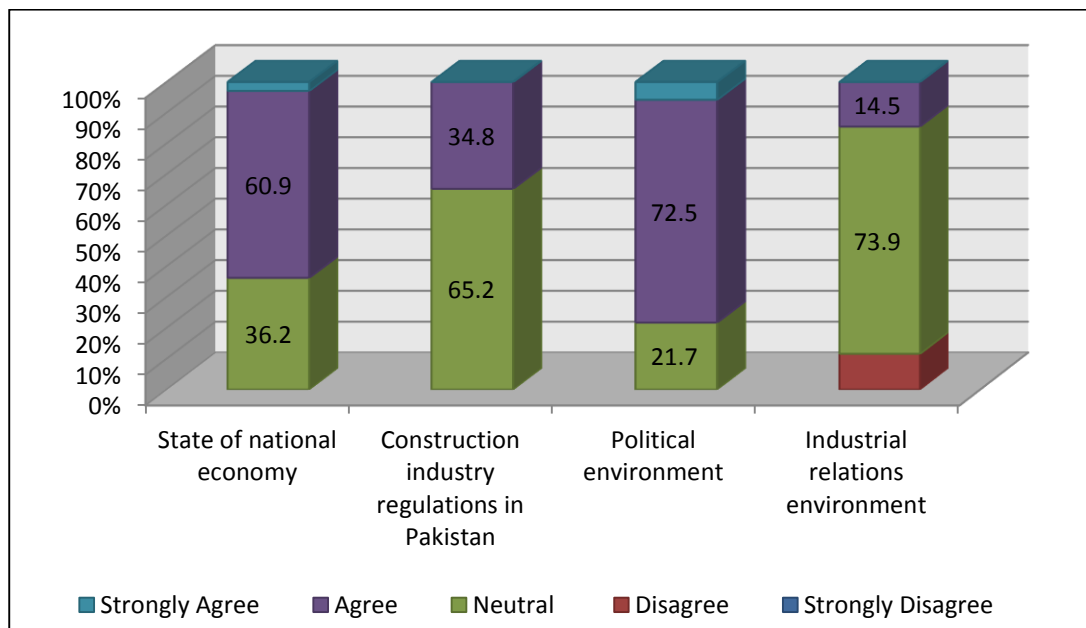
Figure 4.17 Percentages of responses for importance of indicators of external
environment factors.

Indicators of variable external environment factors indicate fewer acceptances than
other variables in the construction industry of Pakistan as shown in Figure 4.18.
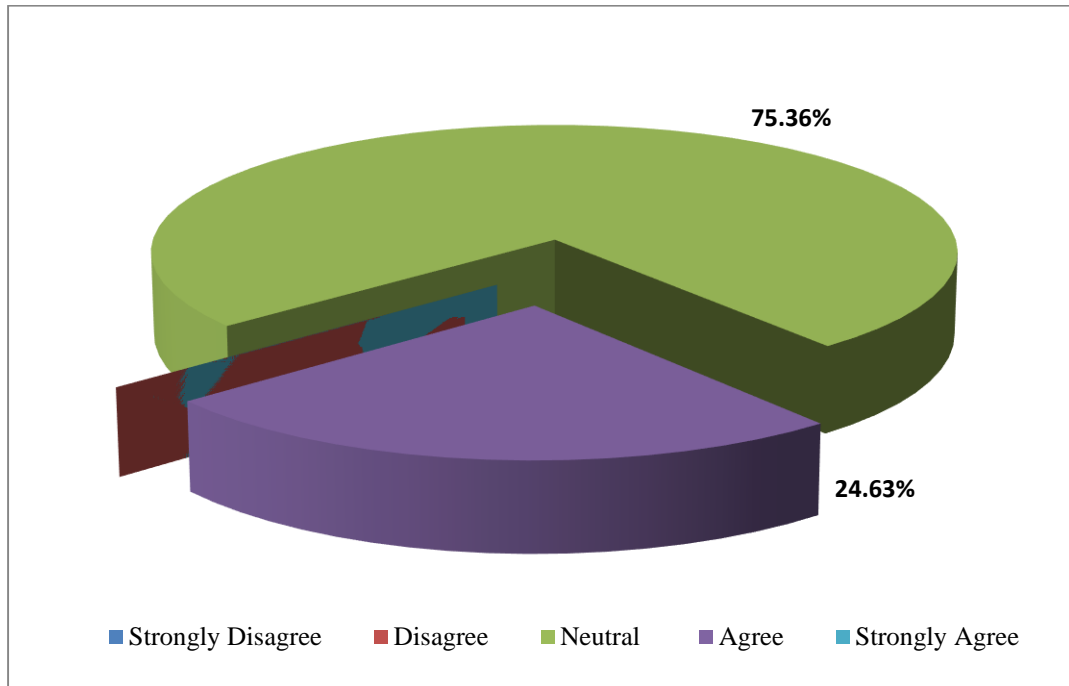
Figure 4.18 Responses for external environment factors.

4.3 SUMMARY OF PERCEIVED PERFORMANCE OF CRITICAL SUCCESS FACTORS

The CSFs selected have positive influence on the organization success. During the interviews impact of these were asked to comment with respect to companies or organizational performance. Entire variables were found contributing towards the performance. The impact of mean value of these variables was calculated which was found positive, and variable having high mean value indicates greater contribution towards success of company/organization.By seeing the effects of means it is obvious that strong strategy is the need of successful business. External factors seem to have least impact on success areas of the industry. Similarly technology variable is also rejected by the respondents as the success factor for construction business. The graphical representation of the relation of these CSF's with respect to the means of the perceived data is shown in the Figure 4.19.
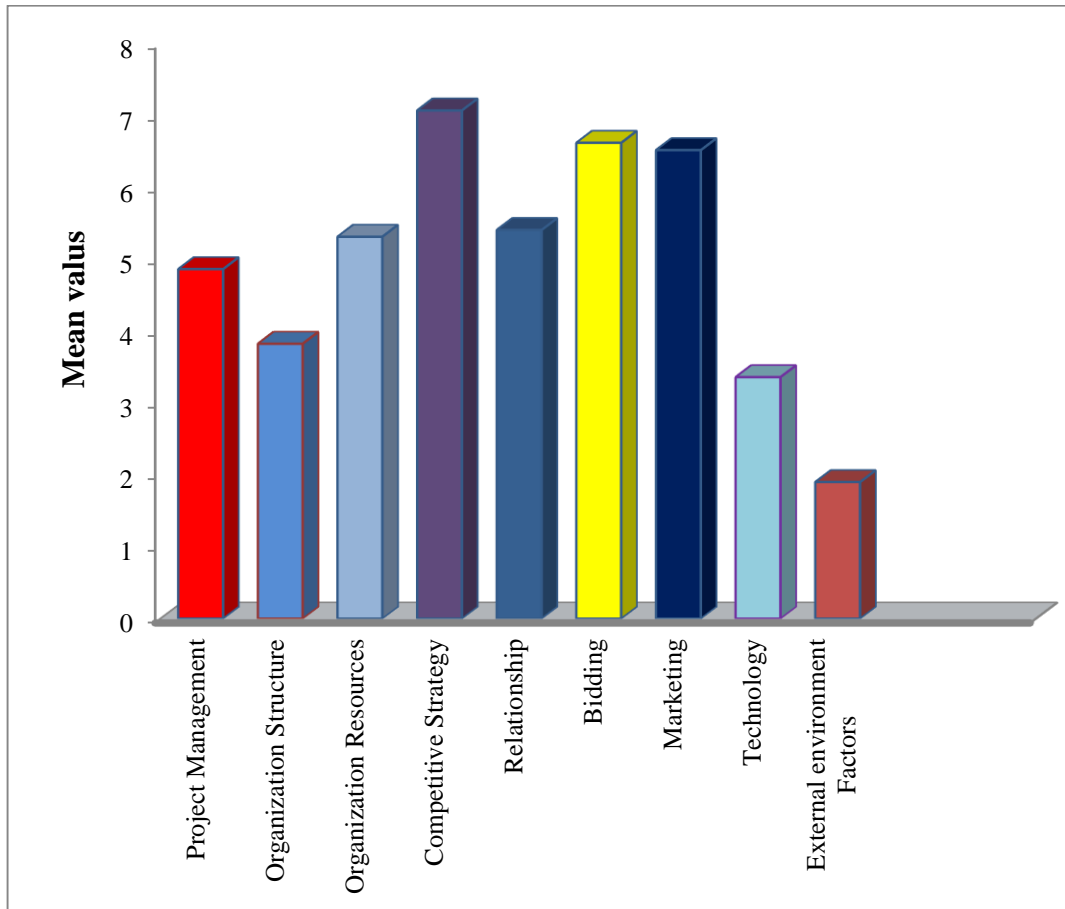
Figure 4.19 CSF's comparing with mean value of perceived response.

On comparison of the responses of the high and low performing organization, it is revealed that the more the value of the performance of an organization or high organizational performance, more value of the mean is linked with it in all the key variables (CSF). They are more likely focusing on these CSF's in order to raise the performance of their organization.

<div align="right">

Chapter 5

</div>

CONCLUSION AND RECOMMENDATIONS

5.1 CONCLUSIONS

Since few studies appear to have undertaken on CSFs for contractors success in building construction projects of Pakistan, this thesis presents the results of a questionnaire survey to explore these CSFs for contractor's success in building construction. Questionnaire of total of 9 CSFs and 60 indicators were synthesized in the survey which were shown to be reliable, interviews were conducted with the project managers, planners and executives of the companies and importance of these factors was critically investigated. Findings of this research concluded that importance of these factors was confirmed by most of the respondents.

Project managers and contractors in Pakistan accepted the importance of competitive strategy of the organization; respondents assigned the most important CSF for success strategy. Importance of technology was not considered as very critical for Pakistan construction industry in the present atmosphere, but realization was there about the usage of technology for high rise building structures. Respondents have given low importance to the indicators pertaining to the CSFs of technology and external environment factors.

Spearman's rank correlation test results indicate that there is a general consensus on the overall rankings of CSFs among different respondents. Correspondents emphasized the relative importance of these CSFs for overall success of project. By seeing the results mostly positive correlation exist among the CSFs except one odd which is not even very strong. Even though there is a general consensus on the rankings of the CSFs among different respondents, the detailed pair wise comparisons actually show the existence of a few differences in perceptions on the relative importance of the CSFs.

The results of the nonparametric test clearly indicate that competitive strategy is the most important CSFs for successful business in the field of building construction. Strategic planning how to organize and compete in the market is the key to get success in the field. Second important CSF in the order of priority is bidding; it makes bidding as an art to gain businesses. It is necessary to have sufficient experienced staff and knowledge of market in order to get successful in bidding procedures. Third important successful factor is marketing, marketing here means making a name/space in the construction industry due to the quality, standards achieved and variety of structure build by the contractor firm. Marketing appears as the key to stay in the market. Fourth important factor in the line is organizational resources; it is obvious that if the contractor acquires competence in first three factors cannot succeed in the business unless he has sufficient resources to handle these projects. Fifth important CSF for successful business in order of priority is relationship, the importance of relationship cannot be denied in any field of life. In construction industry it is like a rule that friendship is more important than the law. Therefore it is one of the prime features to acquire business, to do work without hindrance and complete work with in stipulated time.

Overall, the results reflect that, though the respondents share a certain degree of commonality with respect to the relative importance of the CSFs. It also should be noted that the CSFs in this study were identified by focusing on the Pakistan (78 CA no limit sized firms of Punjab and federal capital). The research findings may not be applicable to construction markets in other countries. For example, technology is not considered important as a CSF in the Pakistan construction market. This indicates that a study on the CSFs for contractor success must refer to the specific market in which that contractor operates because different markets will have individual characteristics, and contractors operate differently when the markets have different social, economic, political, technological, and cultural backgrounds.

5.2   RECOMMENDATIONS

The results obtained can help the contractors to identify the significance of the CSFs for new building projects, and accordingly advises the construction professionals on the suitable project management strategy (CSFs) with respect to different project scenarios. The thesis data are from Punjab, Pakistan the CSFs generated can be tested to generalize to other relevant parts of Pakistan. To confirm the framework of these CSFs, a series of case studies would have to be conducted and contractors are asked to use it and evaluate it, the results should assist in further developing these CSFs.

5.3   FUTURE DIRECTIONS

A case-study of a complex construction project should be piloted to test the validity of the conceptual framework of the identified critical success factors. Research and analysis shall be conducted to study the effectiveness of these CSFs and its comparison with the organizational performance.

The scope of this thesis included the survey of capital city (Islamabad) and Punjab province. In total 78 contractor firms of CA Category (PEC Registered) were selected. Total CA category contractor firms in all provinces of Pakistan are about 117 in number. Although the figure 78 (66.67%) is a large representation of the population, however further survey study should be carried out to include the other provinces to make the entire representation of Pakistan.

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APPENDICES

Appendix 1

LIST OF CONTRACTOR FIRMS

1.1 **CA CATEGORY CONTRACTOR FIRMS (PEC REGISTERED) IN ISLAMABAD (CAPITAL CITY OF PAKISTAN)**

Ser	Contractor Firms
1.	Khyber Grace (Pvt) Ltd
2.	Ch. A. Latif& Sons (Pvt) Ltd
3.	Exceed (Pvt) Ltd (2)
4.	Matracon Pakistan Private Limited
5.	National Construction Limited
6.	Hajaviry Associates (Pvt) Ltd
7.	Ashers Trading & Construction Co
8.	Expertise (Pvt) Ltd
9.	Recent Construction Company
10.	Muhammad Ayub& Brothers
11.	Petrosin Engineering (Pvt) Ltd
12.	Anser Brothers (Pvt) Ltd (New Name)
13.	Techno Engineering Services (Pvt) Ltd
14.	Universal Corporation (Pvt) Ltd
15.	Mumtaz Construction Company (Pvt) Ltd
16.	Skyways Construction (Pvt) Ltd
17.	M.A. Aleem Khan & Sons (Pvt) Ltd
18.	Arshad& Co
19.	Qavi Engineers (Pvt) Ltd
20.	Moinsons (Pvt) Ltd
21.	Sachal Engineering Works (Pvt) Ltd
22.	Karcon Private Limited
23.	Hakas (Pvt) Ltd

1.2 CA CATEGORY CONTRACTOR FIRMS (PEC REGISTERED) IN PUNJAB (PROVINCE OF PAKISTAN)

Ser	Contractor Firms
1.	NPI Construction and Engineering
2.	KKP (Pvt) Ltd
3.	Echo West International (Pvt) Ltd
4.	IVCC Engineering (Pvt) Ltd
5.	Technical Associates Pakistan (Pvt) Ltd
6.	H.A. Construction
7.	ICC (Pvt) Limited
8.	Uni-Build Associates (Pvt) Ltd
9.	Interhome (Pvt) Ltd
10.	Guarantee Engineers
11.	Sadaat Enterprises
12.	Khalid Rauf & Co (Pvt) Ltd
13.	National Power Const Corporation (Pvt) Ltd
14.	HabibRafiq (Pvt) Ltd
15.	MCC Ruba International Real Estate Holding(Pvt)Ltd
16.	Saadullah Khan & Brothers
17.	Choudhry Engineers Associates
18.	Izhar Construction (Pvt)Ltd
19.	HusnainCotex Ltd
20.	Izhar (Pvt) Ltd
21.	Builders Associates (Pvt) Ltd
22.	Mass Constructors
23.	Sarwar& Co (Pvt) Ltd
24.	Habib Construction Services (Pvt) Ltd
25.	Descon Engineering (Pvt) Ltd

Continued

Ser	Contractor Firms
26.	Mughals Pakistan (Pvt) Ltd
27.	RMC Construction Co (New Name)
28.	IBEX Engineering (Pvt) Ltd
29.	Principal Builders
30.	H.M. Associates (Pvt) Ltd
31.	Associated Technologies (Pvt) Ltd
32.	Sinaco Engineers (Pvt) Ltd
33.	Hassan Sarwar Associates
34.	Tanveer Corporation (Pvt) Ltd
35.	Sh. AbdurRazzaq& Co (Pvt) Ltd
36.	A.M. Construction Co. (Pvt) Ltd
37.	GhulamRasool& Company (Pvt) Ltd
38.	Kingcrete Builders
39.	Zahir Khan & Brothers
40.	MIDJAC (Pvt) Ltd
41.	L.A.C (Pvt) Ltd (New Name)
42.	Taameer Associates
43.	S.A.Z. Co (Pvt) Ltd
44.	Pakistan Oilfields Limited
45.	Gammon Pakistan Ltd
46.	Royal Construction Co.(Pvt) Ltd
47.	Simcon Construction Co.
48.	Choudhry Construction Co
49.	Hidayatullah Khan & Co
50.	Nazir& Company (Pvt) Ltd
51.	Malik Abdul Salam & Co
52.	Pak Elektron Limited
53.	PressonDescon International (Pvt) Ltd.
54.	Parco Construction Company
55.	Nissan Engineers Pvt(Ltd)

Appendix 2

COVER LETTER

(RESOURCE MANAGEMENT RESEARCH QUESTIONNAIRE)

To: _____

Subject: <u>**CRITICAL SUCCESS FACTORS FOR CONTRACTORS SUCSESS IN BUILDING CONSTRUCTION RESEARCH QUESTIONNAIRE**</u>

Respected Sir,

Department of **Construction Engineering and Management** at **School of Civil and Environmental Engineering** (NUST) Islamabad is conducting a Research Survey to identify critical success factors for contractors success in building construction in the Construction Industry of Pakistan.

The building construction nowadays in the modern era of development demand specialised equipment, procedures, trained staff, established procedures and detailed management of the whole operation. Contractors in Pakistan vary from educated peoples, peoples working on experienced bases and there is still a category which is unaware of modern development in the field of civil engineering. There is a need to develop set procedures, practices and identify target areas, focussing on which will result into success for a building project and ultimately to the contractor.

Now in Pakistan the construction of high rise building has started coming up in big cities but due to poor economic conditions existed in Pakistan lot of risk is involved with the contractor. High rise building encompasses large budgets, responsibilities and wrong management of the project may through away the contractor firm away from the business for ever. A need was felt to focus on areas which require considerable efforts, so that the project should be completing in the planned time, resources and economic limits. Modern designs require costly and heavy equipment for developing such structures which require deliberate planning and scheduling in order to save time, resources and economy. Therefore this study intends exploring all the areas necessary to increase chances of success for the contractor firms in building construction of Pakistan.

We are visiting different construction sites and contractors and conducting the interviews with professionals involved like project manages owners, consultants and site engineers in order to explore the weak areas, areas requiring more focus and priority then other. Confidentiality is the prime importance in the interviews and information's obtained from respective peoples, we are conducting number of confidential surveys, aimed at the senior management levels, to discover the key success factors necessary for a contractor to focus upon in order to get success in the demanding field. To help with this task, we would like you to answer the best suitable priority for the respective activities given in the questionnaire.

We appreciate your participation in this survey in true letter and spirit. This little time of yours will result into finding the key areas of focus required by the contractor in building construction of Pakistan.

Yours Sincerely,

JAVAID IQBAL
Post Graduate Student
Construction Engineering & Management

DR. RAFIQ MUHAMMAD CHOUDHRY (Ph D)
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Appendix 3

SURVEY QUESTIONNAIRE

2.1 RESPONDENT PROFILE

Org Name / PEC	
Address	
Name / Designation	
PEC Category	
Construction Types	

2.2 QUESTIONNAIRE

2.2.1 PROJECT MANAGEMENT (Best-to-Worst)

		5	4	3	2	1
Q-001	Use of project management techniques					
Q-002	Quality management					
Q-003	Cost management					
Q-004	Contract management					
Q-005	Logistic and supply chain management					
Q-006	Dispute resolving skills					
Q-007	Time management					
Q-008	Site management					
Q-009	Risk identification and allocation					
Q-010	Project managers experience					
Q-011	Knowledge and expertise on law					
Q-012	Environmental management					
Q-013	Project insurance					
Q-014	Claim skills					
Q-015	Health and safety management					
Q-016	Resource management					
Q-017	Documentation and record keeping					
Q-018	Plant management					

2.2.2 ORGANIZATION STRUCTURE (Best-to-Worst)

		5	4	3	2	1
Q-019	Leaders personality and capability					
Q-020	Motivation and job satisfaction					
Q-021	Integration between management and general staff					

Q-022	Suitability of organization structure					
Q-023	Communication and coordination among functional departments					
Q-024	Firm's history					
Q-025	Firm's size					
Q-026	Organization culture					
Q-027	Clearly defined and allocated functions for different departments					
Q-028	Company's internal environment					
Q-029	Selection of key personnel					
Q-030	Recruitment system(permanent or temporary staff)					

2.2.3 ORGANIZATION RESOURCES   (Best-to-Worst)

		5	4	3	2	1
Q-031	Cash flow management					
Q-032	Financial resources					
Q-033	Financial ability					
Q-034	Financial stability					
Q-035	Current capacity of human resource					
Q-036	Sustainable development of human resources					
Q-037	Procurement practices					
Q-038	Proper decision to purchase or hire plant					

2.2.4 COMPETITIVE STRETEGY   (Best-to-Worst)

		5	4	3	2	1
Q-039	Existence of Strategy, how to compete in market					
Q-040	Matching Strategy to a company's situation					
Q-041	Procedures involved in implementation of strategy					
Q-042	Awareness of employees about company's strategy					
Q-043	Resourcefulness					

2.2.5 RELATIONSHIP   (Best-to-Worst)

		5	4	3	2	1
Q-044	Relationship with client and owners					
Q-045	Relationship with subcontractors and suppliers					
Q-046	Relationship with government departments					
Q-047	Relationship with designers and consultants					
Q-048	Relationship with public					

2.2.6   BIDDING   (Best-to-Worst)

		5	4	3	2	1
Q-049	Bidding strategy					
Q-050	Experience in bidding					
Q-051	Bidding resources					

2.2.7   MARKETING   (Best-to-Worst)

		5	4	3	2	1
Q-052	Capability of gathering and processing information of new projects/contracts					
Q-053	Availability of products and price information of labor, material, plants and other resources					
Q-054	Business coverage					

2.2.8   TECHNOLOGY   (Best-to-Worst)

		5	4	3	2	1
Q-055	Use of technology in business					
Q-056	Level of I.T. application in company					
Q-057	Sustainable development of technology and R&D					

2.2.9   EXTERNAL FACTORS   (Best-to-Worst)

		5	4	3	2	1
Q-058	State of national economy					
Q-059	Construction industry regulations in Pakistan					
Q-060	Political environment					
Q-061	X-factors(fraudulent practices, corruption, favoritism, lack of ethics etc)					
Q-062	Natural disasters/Bad weather					

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Appendix4

TEST OF NORMALITY

			Statistic	Std. Error
Project Management	Mean		4.1014	.04683
	95% Confidence Interval for Mean	Lower Bound	4.008	
		Upper Bound	4.1949	
	5% Trimmed Mean		4.0894	
	Median		4.000	
Organisation Structure	Mean		3.8406	.04439
	95% Confidence Interval for Mean	Lower Bound	3.7520	
		Upper Bound	3.9292	
	5% Trimmed Mean		3.8784	
	Median		4.0000	
Organization Resources	Mean		4.2174	.05792
	95% Confidence Interval for Mean	Lower Bound	4.1018	
		Upper Bound	4.3330	
	5% Trimmed Mean		4.2182	
	Median		4.0000	
Competitive Strategy	Mean		4.6812	.05651
	95% Confidence Interval for Mean	Lower Bound	4.5684	
		Upper Bound	4.7939	
	5% Trimmed Mean		4.7013	
	Median		5.000	
Relationship	Mean		4.2464	.05225
	95% Confidence Interval for Mean	Lower Bound	4.1421	
		Upper Bound	4.3506	
	5% Trimmed Mean		4.2182	
	Median		4.000	

			Statistic	Std. Error
Bidding	Mean		4.5507	.06702
	95% Confidence Interval for Mean	Lower Bound	4.4170	
		Upper Bound	4.6845	
	5% Trimmed Mean		4.5886	
	Median		5.0000	
Marketing	Mean		4.5507	.06032
	95% Confidence Interval for Mean	Lower Bound	4.4304	
		Upper Bound	4.6711	
	5% Trimmed Mean		4.5564	
	Median		5.0000	
Technology	Mean		3.6667	.07052
	95% Confidence Interval for Mean	Lower Bound	3.5259	
		Upper Bound	3.8074	
	5% Trimmed Mean		3.6530	
	Median		4.0000	
External factors	Mean		3.2464	.05225
	95% Confidence Interval for Mean	Lower Bound	3.1421	
		Upper Bound	3.3506	
	5% Trimmed Mean		3.2182	
	Median		3.0000	

Appendix 5

SPEARMAN'S RHO CORREALTION

		Project Management	Organization Structure	Organization Resources	Competitive Strategy	Relationship	Bidding	Marketing	Technology	External environment Factors
Project Management	Pearson Correlation	1	.217	.352**	.180	.372**	.146	.011	.086	.198
	Sig. (2-tailed)		.073	.003	.139	.002	.232	.929	.482	.103
	N	69	69	69	69	69	69	69	69	69
Organization Structure	Pearson Correlation	.217	1	.281*	.212	.249*	.291*	-.075	.091	.157
	Sig. (2-tailed)	.073		.019	.081	.039	.015	.540	.458	.197
	N	69	69	69	69	69	69	69	69	69
Organization Resources	Pearson Correlation	.352**	.281*	1	.116	.233	.425**	-.077	.261*	.021
	Sig. (2-tailed)	.003	.019		.342	.054	.000	.530	.030	.861
	N	69	69	69	69	69	69	69	69	69
Competitive Strategy	Pearson Correlation	.180	.212	.116	1	.175	.119	-.118	.089	.103
	Sig. (2-tailed)	.139	.081	.342		.151	.330	.335	.466	.402
	N	69	69	69	69	69	69	69	69	69

Relationship	Pearson Correlation	.372**	.249*	.233	.175	1	.161	-.024	-.019	.063
	Sig. (2-tailed)	.002	.039	.054	.151		.188	.842	.875	.605
	N	69	69	69	69	69	69	69	69	69
Bidding	Pearson Correlation	.146	.291*	.425**	.119	.161	1	.057	.301*	.161
	Sig. (2-tailed)	.232	.015	.000	.330	.188		.644	.012	.188
	N	69	69	69	69	69	69	69	69	69
Marketing	Pearson Correlation	.011	-.075	-.077	-.118	-.024	.057	1	-.117	.178
	Sig. (2-tailed)	.929	.540	.530	.335	.842	.644		.339	.143
	N	69	69	69	69	69	69	69	69	69
Technology	Pearson Correlation	.086	.091	.261*	.089	-.019	.301*	-.117	1	.039
	Sig. (2-tailed)	.482	.458	.030	.466	.875	.012	.339		.753
	N	69	69	69	69	69	69	69	69	69
Exterrnal environment Factors	Pearson Correlation	.198	.157	.021	.103	.063	.161	.178	.039	1
	Sig. (2-tailed)	.103	.197	.861	.402	.605	.188	.143	.753	
	N	69	69	69	69	69	69	69	69	69

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).