STUDY OF MERITS AND DEMERITS OF APPOINTING SAME DESIGN CONSULTANT AS SUPERVISION CONSULTANT IN THE CONSTRUCTION INDUSTRY IN PAKISTAN

A thesis submitted in partial fulfillment of
the requirements for the degree of

Master of Science
in
Construction Engineering and Management

by

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Thesis titled

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Submitted by

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has been accepted towards the partial fulfillment

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DEDICATED

TO

MY FAMILY

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ABSTRACT

The construction project consulting services is very important to the project lifecycle. When a project sponsor or client selects the project implementation mode and the contract type, they analyze the very important questions, i.e. who is responsible for the design and construction supervision of the project? How to arrange the design work and the supervision work? Should the design work and the supervision work be carried out by a single consulting firm having the required qualification and capacity? Whether the company can provide services for both the design and site supervision for the project? Should design services and construction supervision services be delivered by the separate entities?

Consulting engineering services are defined as technology-based intellectual services of advisory, supervisory, or implementation nature provided by consultants who may be individual experts or consulting firms. Different methods for carrying out selection of consultants has been documented in the literature and by PPRA and FIDIC. Such methods include Quality based selection (QBS), Quality and cost based selection (QCBS), least cost selection (LCS), Single source selection, and Fixed budget selection.

This thesis presents a questionnaire based study of merits and demerits of appointing a same design consultant as supervision consultant in the construction industry in Pakistan. Based on the literature review a questionnaire was designed to collect data for this study. The checklist format was adopted for the development of a questionnaire. The questionnaire was comprised of five sections of the project phases including project initiating phase, project planning and design phase, project execution phase, project monitoring and control phase, and project closing phase. The questionnaire was distributed to engineers and architects for their responses who used to work with different firms registered with the Pakistan Engineering Council. Response of 98 valid questionnaires was analyzed by using MS Excel and SPSS-19.

Both merits and demerits of appointing the same design consultant as supervision consultant were investigated. The results of research show that stakeholders (owner or client, consultants, contractors and researchers) strongly support appointing the same design consultant as supervision consultant. The results indicated that the merits are more than double to that of demerits of appointing the same design consultant as supervision consultant in the construction industry in Pakistan. Stakeholders consider that it is quite appropriate to have same design consultant as supervision consultant at all

project phases. Design and supervision services are to be simultaneously provided by one consulting firm. Results further indicate that it is not appropriate to employ different professionals on a project for these two services when close coordination is generally required for the successful completion of the same. Research concludes that there is no harm to appoint a third party for design vetting. Finally, the results of this study may be useful for clients, consultants and contractors who desire good services from designers and consultants.

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LIST OF ABBREVIATIONS

ADB	Asian Development Bank
BTP	Bio data Technical Proposal
CEI	Consulting Engineering Industry
CO	Change Order
CQS	Consultant's Qualification Selection
CSC	Consultant Selection Committee
CSOM	Consulting Services Operations Manual
DC	Design Competition
EA	Executing Agency
ECNEC	Executive Committee of National Economic Council
EIA	Environmental studies and Impact Assessments
EOI	Expression of Interest
FBS	Fixed Budget Selection
FIDIC	Fédération Internationale Des Ingénieurs-Conseils (International Federation of Consulting Engineers)
FTP	Full Technical Proposal
GEFP	Gross Evaluated Financial Proposal
GFP	Gross Financial Proposal
GOP	Government of Pakistan
IA	Implementing Agency
ITC	Instructions to Consultants
JV	Joint Venture
LCS	Least Cost Selection
LOI	Letter of Invitation
NCF	National Consulting Firm
NGO	Non-Government Organization
PCSR	Procurement of Consultancy Services Regulations
PEC	Pakistan Engineering Council
PIP	Price Induced selection Practice
PMBOK	Project Management Body of Knowledge
PN	Price Negotiations
PPR	Public Procurement Rules
PPRA	Public Procurement Regulatory Authority
QBCS	Quality Based Consultant Selection
QBS	Quality Based Selection
QCBS	Quality and Cost Based Selection
RFI	Request for information
RFP	Request for Proposal
RFT	Request for Tender
SDO	Sub-Divisional Officer
SPSS	Statistical package for social sciences
STP	Simplified Technical Proposal
TA	Technical Assistance
TOR	Terms of Reference
USA	United States of America
VO	Variation Order
WBM	Work Breakdown Structure

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Chapter 1

INTRODUCTION

1.1 STUDY BACKGROUND

The construction project consulting service is very important to project lifecycle. The project owner or sponsor while selecting the consultant, must give though to which party will be responsible for design and supervision work? (Bunni 2005).

At the time of organizing the project, the owner or sponsor has questions in front of him i.e. how to manage the design work and the supervision work? Should he engage single consulting company which will provide the services of both design and supervision work with corresponding qualification and capacity (i.e. the company can provide the service of both design and supervision)? Or should he engage different consulting firms for design and supervision work?

Federation Internationale Des Ingenieurs-Conseils (FIDIC), in 'FIDIC Guidelines for the selection of consultants', clarifies that consulting engineering industry (CEI) undertakes activities related to planning, designing, constructing, inspecting and managing the infrastructure required for meeting the ever-increasing demands for energy, transportation, shelter, health and water etc. The role of construction project consultants play vital role in the construction projects maturity and lifecycle. Some clients, who lack in complete understanding of consulting services, use routine procedures for selection of consulting engineers. There are many selection procedures are documented, however; not all of them acknowledge the true value of the services provided by consultants. Most of these procedures are deliverable-oriented.

According to 'FIDIC Guidelines for the Selection of Consultants': It is the responsibility of the clients to select an appropriate consultant as it will impact on overall quality of the project. The consultancy costs in normally 3 to 4 percent of the project's life cycle cost, yet the selection of a proper consultant is critical for the success of entire project.

In this research, study of merits and demerits of appointing same design consultant as supervision consultant in the construction industry in Pakistan is carried out. Conclusions and recommendations in relation to merits and demerits of appointing

same design consultant as supervision consultant have been drawn based on statistical analysis of the data by using MS-Excel and SPSS-19.

1.2 RESEARCH OBJECTIVES

The objectives of this research are as follows:-

a) To define a consultant, identify types, study the difference between the design and the supervision consultant in construction industry in Pakistan;

b) To study the appointment/procurement of consultancy services in the industry;

c) Evaluate merits and demerits of appointing same design consultant as supervision consultant in the construction industry;

d) Analyze the collected data and draw conclusion and recommendation for the benefit of the industry;

1.3 RESEARCH SIGNIFICANCE

The achievement of research objective mentioned above at sr. (a) and (b) may be of significant importance to owner or client in Pakistan because it may help them in comprehensive understanding of different consultant selection methods, key concepts in the selection process and the reason to hire consultants. 'FIDIC Guidelines for the Selection of Consultants' state that one of the important factors in success of a project is obtaining the services of the most competent and dependable consultant. Public Procurement Regulatory Authority (PPRA) of Pakistan promulgated regulations for procurement of consultancy services in 2010. Said regulations are known as 'Procurement of Consultancy Services Regulations (PCSR) 2010'. Relevant regulations from PCSR 2010 by will be cited at appropriate places in this thesis along with relevant details from publications of World Bank, Asian Development Bank (ADB), and FIDIC. This may be helpful to owner or client in Pakistan in gaining basic comprehension of PCSR 2010.

The achievement of research objectives at sr. (c) and (d) may be of significant importance to owner or clients in Pakistan and will answer the question that, should he hire single consulting firm for both design and supervision services with corresponding

qualification and capacity of the consultant (i.e. the firm can provide the service of both design and supervision)? Or should he engage different design and supervision consultant to these two services.

1.4 SCOPE AND LIMITATION

The scope of this study is limited to construction industry in Pakistan and mainly consist of perception of key stakeholders i.e. clients or owners, consultants, contractors or subcontractors and academia or researchers. The perception of the stakeholders about study of merits and demerits of appointing same design consultant as supervision consultant in construction industry in Pakistan at different project phase i.e. project initiating phase, project planning and design phase, project execution phase, project monitoring and control phase and project closing phase. An attempt has been made to include as many types of projects as possible in the survey like building, infrastructure and roads, bridges/flyovers, runways, dam/hydal power/canals, communication civil work, tunnel, transmission line. Data is collected through questionnaire based survey and interviews, from different construction companies/organizations working on diverse projects in different cities of Pakistan. Keeping in view the limited time and resources, the under construction projects located in Rawalpindi, Islamabad, Fateh Jhang, are visited personally for data collection whereas the data from other cities is collected through mail/email.

1.5 ORGANIZATION OF THESIS

The thesis is organized in five chapters. Chapter 1 consists of an introduction and chapter 2 covers literature review. The publications of World Bank, ADB, FIDIC, PPRA and Pakistan Engineering Council (PEC) constitute major fraction of the literature. Chapter 3 describes research methodology and chapter 4 covers data analysis and results. The final (5^{th}) chapter presents conclusions and recommendations.

1.6 SUMMARY

The construction project consulting service is play vital role in project lifecycle. At the time of organizing the project, the owner or sponsor has questions in front of him

i.e. how to manage the design work and the supervision work? Should he engage single consulting company which will provide the services of both design and supervision work with corresponding qualification and capacity (i.e. the company can provide the service of both design and supervision)? Or should he engage different consulting firms for design and supervision work?

This thesis presents a questionnaire based research study for merits and demerits of appointing the same design consultant as supervision consultant in the construction industry in Pakistan. Conclusions and recommendations in relation to merits and demerits of appointing same design consultant as supervision consultant have been drawn based on statistical analysis of the data.

Chapter 2

LITERATURE REVIEW

2.1 INTRODUCTION

In this Chapter, engineering consultant, their types and role, duties and responsibilities, and consulting services is defined in the light of publications of ADB, FIDIC, PPRA and The Secretariat for the Committee on Infrastructure Planning Commission, Government of India. The need and importance of consulting services will be discussed briefly. Key concepts and different methods of appointing/procurement of consultants will constitute bulk of this chapter.

2.2 DEFINITION OF ENGINEERING CONSULTANT

Generally a consulting engineer is defined as a professional who mainly has two mixed expertise of practical professional experience and those of a business individual who is applying his capabilities in delivering the professional services to the clients against money (Al-Basher, 1998).

According to "Consulting Services Operations (CSO) Manual" developed by ADB, consultants are defined as "Individuals or firms who are capable of providing particular expertise in one or more fields. These services may be of suggestion, supervisory, or implementation nature and are provided by professional experts with specific knowledge and experience". The 'CSO Manual' further states that the consultants render intellectual services for a finite time period under a well-defined scope of services. The scope of services is defined in the Terms of Reference (TOR). According to (QBCS 2012, FIDIC); Companies and individuals who provide consultancy Services as a commercial activity.

2.3 TYPES AND ROLE OF CONSULTANTS

("The Secretariat for the Committee on Infrastructure Planning Commission, Government of India") declare that, there are different types of consultants with their distinguish role include:

a) Lead Consultants

Lead consultants can play key role in formulation of policy and where new rule and regulations, pricing or costing, etc. are being required. They also help in the industry market structures as well as the design of the regulatory framework. They can help in direction tendering for the project, including the selection of legal, financial, or technical support. Where necessary or appropriate the task of lead consultant may be assigned to other consultant e.g. financial or technical or legal consultant.

b) Financial Firms

They are generally required for helping in bidding process and preparing a proper financial model of project for clients. The financial skill and relevant experience are two major key concepts for the selection of financial firms. These consultants are hiring for special financial expertise which is not available in-house. Where necessary or appropriate the financial consultant may also be assigned or may function as lead and transaction advisers.

c) Legal Consultants

The role of legal consultant is critical in public private partnership projects. They can draft contracts, sub-contractors agreements, professional appointments, concessions, bonds and warranties, audits, development agreements, licenses and provide advice on the prequalification process, evaluation of bidding documents and proper execution of contracts. The legal consultants should have rich experience of all commercial types of contracts and understanding of project authorities.

d) Technical Consultants

Technical consultants are required for preparing feasibility reports, project standards and specifications, and project duration and cost. These consultants should have wide range of technical and professional experience of the specific sector. Technical consultant’s services may include a wide range of professional skills and services including but not limited to detailed

architectural and engineering design, quantity and cost estimation, Geo-technical studies, traffic studies, feasibility studies and reviews, realistic project scheduling and project monitoring and control management.

2.4 RESPONSIBILITIES OF ENGINEERING CONSULTANTS

Responsibilities of engineering consultants may include, but are not limited to:

- Architectural and engineering expertise
- Pre-feasibility studies
- Maintaining continual
- High level contacts with public and private officials
- Project and program management
- Providing drawings and design calculations required for works
- Making independent decisions based on realistic study
- Manage the project within in budget

(Ofori, 2001).

2.5 SERVICES BY ENGINEERING CONSULTANTS FIRMS

According to "ADB guidelines, 1998" services offered by the engineering consultants firms include Pre-investigation studies, detailed engineering and design, project implementation, and special services. These services are described in details as follow:

- **Pre Investment Studies**
  - Studies to establish investment priorities and sectored policies
  - To evaluate government operations and institutions for project formulation and implementation
  - To carryout feasibility studies
  - Justification and validation of investment projects.
- **Detailed Engineering and Design**
  - Detailed design preparation
  - Technical and special specifications
  - Quantity and cost estimates
  - Preparation of bidding documents etc.

- **Project Implementation**
  - Project supervision as per contract
  - Implementation of training programs.
  - Financial studies
- **Special Services**
  - Environmental and impact assessment
  - Forensic or failure investigation
  - Geotechnical study
  - Simulation and prototype studies
  - Pilot studies, computer modeling
  - Safety engineering
  - Surveying engineering
  - Toxic and hazardous waste evaluation

The FIDIC (International federation of consulting engineers) is the most authoritative and authentic consulting engineer organization in the world. According to FIDIC, the consulting services include,

- counseling services
- pre-feasibility studies
- Detailed design
- preparation of contract documents
- specialized design and design development
- Supervision
- Project management
- program manager

(Bunni, 2005).

2.6 SERVICES BY DESIGN AND SUPERVISION CONSULTANTS

According to FIDIC Quality Based Consultant Selection (QBCS 2012) Guide, difference between design and supervision consultants is the services they provide. The services provided by design and supervision consultants are:

a) Design Consultants

When the owner or client engages the design firm to design the project, he wants to convert his ideas about the project into concrete and feasible schemes through drawings with the help of professional personal's experience and knowledge, so the construction company could execute the construction according to the drawings.

Normally, the services provided by design consultants include:

- Project planning and feasibility studies
- Project financial studies and analysis
- Environmental studies and impact assessments (EIAs)
- Sustainability studies
- Field investigation and surveys
- Evaluation of bids
- Economic/financial studies
- Conceptual, developed and detailed engineering design
- Preparation of tender documents
- Architectural services

b) Supervision Consultants

Generally, the scope of the supervision consultants includes:

- Construction supervision
- Project/ program management
- Quality management
- Construction management
- Cost and financial management
- Contract management
- Commissioning and decommissioning
- Valuation services
- Failure/forensic investigation
- Technical training
- Risk analysis and management
- H&S management
- Operation and maintenance

- Health & safety studies
- Quantity surveying and value engineering
- Social impact studies

2.7 WHY OWNER OR CLIENT HIRE CONSULTANTS

Employing experienced consultants enables the project authorities to enhance the possibilities of a successful project; helps in minimizing costly mistakes, promotes capacity building within the government and builds investor confidence in the entire process. By compromising the consultants, will cause higher cost and low quality of project. It can also compromise the public exchequer in the form of uncompetitive bids as well as subsequent contractor's claims may be reduced due to the input of both consultants team in planning and design phase for additional payments or compensation. Being long-term contracts, their adverse impact on users and the public exchequer would normally be far greater than in a typical construction contract. Moreover, the contractor's claims may be reduced due to the input of both consultants team in planning and design phase of a concessionaire often include foregone revenues over the concession period, which implies very large contractor's claims may be reduced due to the input of both consultants team in planning and design phase against the public exchequer. For these reasons, it is critical to ensure that projects are structured properly with the help of best available expertise/consultants ("The Secretariat for the Committee on Infrastructure Planning Commission, Government of India").

2.8 IMPORTANCE OF CONSULTANT SELECTION

The importance of consultant selection in light of FIDIC's 'Quality Based Consultant Selection (QBCS) Guide', 'FIDIC Guidelines for the Selection of Consultants', and FIDIC's 'Guidelines for Integrity Management in the Consulting Industry' is as follows:-

- Selecting a consultant for an assignment or project is normally a vital decision for the client. This decision can have significant impact on overall success of project. Every project has its unique challenges, and its success depends upon meeting the challenges by using the most appropriate expertise

available in market in terms of qualification, knowledge, experience, skill, managerial abilities and reputation;

- The cost of consultancy services normally ranges from **3 to 4 percent** of total project cost, yet the work of Consultants of paramount importance to success of project. Therefore, selecting the most appropriate and competent consultant for the project is very important for the Client and entire project.
- Clients or owners become better aware of the importance of consultant selection and the impact of the choice of the consultant on the overall quality and cost of the completed project. Consultant's selection is very important to the success of the project over its complete life cycle; to save a small percentage (from the consultant's fee), is not worthwhile considering the potential risks/hazards can be identified more efficiently.

2.9 APPOINTMENT OF CONSULTANCY SERVICES

According to Public procurement Regularity Authority (PPRA), the appointment/procurement of consultants/consulting firms is carried out in the following ways:

2.9.1 Consultancy Service Committee

Before procurement of consultancy services, it is extremely important to constitute a consultancy service committee because procurement of consultancy services is a specialized and technical field. Members of consultancy service include from within or outside the procuring agency as shown in figure 2.1.

Head of the procuring agency - (Chairperson)
Technical expert of the procuring agency - (Member)
Technical expert outside the procuring agency - (Co-Opted Member)
Head of the procurement section or department of the procuring agency (Member or Secretary)
Financial/Budget Expert in-house or outside – (Member)

Figure 2.1: Consultancy service committee

2.9.2 Preparation of Term of Reference (TOR)

The TOR is very important for achieving effective and sustainable development goal and is the base of any technical assistance procurement. TOR defines the project background, the basis, the approaches, the inputs, the financial limitation and time scale. Mainly, it is about the specification writing of a project. The purpose and common requirement of TOR is shown in figure 2.2. Checklist for preparation of TOR is further described at appendix-I.

Purpose and Common Requirements of a TOR

- It describe project history
- It indicates objectives and scope of the work
- It indicate outputs of the work
- TOR consists of plan of work including work methodology and timelines.
- TOR may require seminars, meetings, and workshops etc
- TOR is required for the development of feasibility studies, evaluation, and mission of appraisal nature, design review and capacity building.

Figure 2.2: Term of reference

2.9.3 Methods of Selection of Consultants Firms

According to PPRA there are following method of selection of consultants/consultancy firms;

1) Quality based selection
2) Quality and cost based selection
3) Least cost selection
4) Single source selection
5) Fixed budget selection

2.9.3.1 Quality based selection (QBS)

Quality based selection method is totally based on evaluating only single technical proposals of the consultant who has submitted the highest ranked technical

proposal as shown in figure 2.3. Evaluation procedure for QBS is further described at appendix-II.

PPRA – Procurement of Consultancy Services Regulations, 2010

Regulation 3 (A): Quality based selection:-

i. This method will be used where owner or sponsor wants only quality of work irrespective of the cost of the project. This method will suit highly complicated nature of works or assignments. Procurement agency has to get prior written approval from the concern authority to the use of this method.

ii. Steps for quality based selection method include:

a) A request for EOI is advertised to the interested consultants as per regulation 5 of PPRA.

b) Interested consultants are short-listed. A RFP is prepared and sent to short-listed consultants by following the required criteria.

c) There are two kind of proposal which were asked form the consultants to submit according to the laid down procedure. The evaluation of proposals is carried out in the following way;

i) The technical proposals shall be evaluated and the consultant attain maximum technical score is rank as no.1 and is only proceed for financial opening and evaluation.

ii) The financial proposals of the only selected consultant shall be opened in the presence of the applicants or their representatives.

iii) Highest ranked proposal is accepted, and forwarded to the final approving authority.

Figure 2.3: Quality based selection

Quality based selection (QBC) method is suitable when:

i) Projects or assignments are very complicated and where it is hard to define the precise scope of the project or assignment.

ii. Project or assignments where quality is preferred over cost of the project.

2.9.3.2 Quality and cost based selection (QCBS)

Quality and cost based is the most preferred method as it ensures maximum economy and efficiency. This method allows for flexibility in proportioning in weighing quality and costs depending on the owner and project requirements. This method will be suitable where high quality is leading concern whereas cost is a secondary concern as shown in figure 2.4. Quality and cost based selection (QCBS) method is suitable when the scope and TOR are specific and clearly defined. Evaluation procedure for CQBS is further described at appendix-III.

PPRA – Procurement of Consultancy Services Regulations, 2010

Regulation 3 (B): Quality and cost based selection:-

i. This method shall be suitable where high quality is the leading concern whereas cost is a secondary concern;

ii. Steps for quality and cost based selection (QCBS) method includes.

a) A request for EOI is advertised for the interested consultants as per regulation 5 of PPRA.

b) Interested consultants are short-listed. A RFP is prepared and sent to short-listed consultants by following the required criteria.

c) There are two kind of proposal which were asked form the consultants to submit according to the laid down procedure. The evaluation of proposals is carried out in the following way;

i) Technical Proposals shall be evaluated and the consultants attain minimum technical threshold will be further considered for financial evaluation.

ii) The financial proposals of the consultant shall be opened in the presence of the applicants or their representatives.

iii) Combined evaluation of technical and financial proposals is being carried out in the proportion as described in the RFP. The consultant with max combine score will be forwarded for the contract award.

Figure 2.4: Quality and cost based selection

2.9.3.3 Least cost selection (LCS)

Least cost selection (LCS) may be appropriate depending on the nature of the project to be undertaken by the owner or sponsors. The RFP shall define minimum technical threshold. Technical proposals will be opened first and evaluated. The consultants who do not secure the minimum technical threshold are rejected. Financial proposals of consultants who have qualified the minimum technical threshold will be opened in public in the presence of their representatives. The firm/consultants with the lowest price shall then be selected for contract award as shown in figure 2.5. Evaluation procedure for LCS is further described at appendix-IV.

PPRA – Procurement of Consultancy Services Regulations, 2010

Regulation 3 (C): Least cost (selection):-

i. This method will only be suitable for project or assignments where work is of routine nature, simple and well recognized practices exist already.

ii. Steps for least cost selection method include:

a) A request for EOI is advertised for the interested consultants as per regulation 5 of PPRA.

b) Interested consultants are short-listed. A RFP is prepared and sent to short-listed consultants by following the required criteria.

c) There are two kind of proposal which were asked form the consultants to submit according to the laid down procedure. The evaluation of proposals is carried out in the following way;

i) Technical Proposals shall be evaluated and the consultants attain minimum technical threshold will be further considered for financial evaluation.

ii) The financial proposals of the consultant shall be opened in the presence of the applicants or their representatives. The consultant with lowest price is rank as no.1 and selected for the contract award.

Figure 2.5: Least cost selection

2.9.3.4 Single source selection (SSS)

The situation where single source selection method is used is described in figure 2.6. Evaluation procedure for Single source or direct selection is further described at appendix-V.

PPRA –Procurement of Consultancy Services Regulations, 2010

Regulation 3 (D): Single source or direct selection

i. This method will be suitable only in special cases for example;

For works which are continuation of preceding work, where continuity of technical services is inevitable, repeating nature of work, in case of some emergency and where only single consultant has such expertise of work.

ii. Steps for single source selection method include:-

a) The validation and explanation for single source selection method to ensure efficiency of the project within the specific budget. Principal accounting officer gives the written approval for use of this method.

b) Interested consultants are short-listed. A RFP is prepared and sent to the consultant by following the required criteria.

c) Technical and financial evaluation of consultant is carried out followed by negotiation. The contract is awarded to the consultants after successful negotiation.

Figure 2.6: Single source selection

2.9.3.5 Fixed budgeted selection

This method can only be suitable for project which have well-defined term of reference and where budget of project is fix. The RFP shall include the offered budget, the minimum technical threshold. The owner carried out the technical evaluation of the consultant first. The consultants reached the minimum technical threshold are selected for the financial opening. In financial opening the proposals which are more than the budget offered are rejected. From rest of proposal the highest ranked technical proposal is selected for the contract award as shown in figure 2.7. Evaluation procedure for fixed budgeted selection is further described at appendix-VI.

PPRA – Procurement of Consultancy Services Regulations, 2010

Regulation 3 (E): Fixed budget selection method

i. This method can only be suitable for project which have well-defined Term of reference and where budget of project is fix.

ii. Steps for fixed budget method include;

a) A request for EOI is advertised to the interested consultants as per regulation 5 of PPRA.

b) Interested consultants are short-listed. A RFP is prepared and sent to the consultant by following the required criteria.

c) Consultants which have met the minimum technical threshold are processed for financial opening and evaluation.

d) Consultants with financial proposal more than the fixed budget are rejected. From rest of consultants the highest technically ranked consultant is selected for contract award.

Figure 2.7: Fixed budgeted selection

2.9.4 Conflict of Interest

It is always necessary for the staff of procurement unit of any procurement agency to keep in mind the code of ethics. The criteria for code of ethics during the procurement process are shown in figure 2.8.

PPRA – Procurement of Consultancy Services Regulations, 2010

Regulation 4: Criteria for eligibility of consultants.-

The procuring agency shall not engage a consultant where there is any doubt of conflict of interest. If procurement agency has hired the consultants for the project, it shall be banned from providing consulting services for the same project. Similarly, a consultant shall not be hired for any assignment which by its nature, may be in conflict with another assignment of that consultant.

Figure 2.8: Conflict of interest

2.9.5 Expression of Interest

An expression of interest (EOI) is basically the request to the interested consultant to participate in a project. EOI is generally invited through the media in Urdu or English language from local consultants and in English from international consultants. The regulation of EOI is shown in figure 2.9.

PPRA – Procurement of Consultancy Services Regulations, 2010

Regulation 5: Expression of interest:

1) For national consultants, expression of interest shall be advertised in the newspaper and at PPRA website by providing applicants minimum fifteen calendar days and thirty calendar days for international consultants.

2) The EOI shall enclose minimum the following information:

a) Procurement agency name and address;

b) The scope of the project for which EOI is requested.

c) Place and deadline for submission of EOI.

d) Criteria for evaluation of proposal.

Figure 2.9: Expression of interest

2.9.6 Criteria for Short-Listing/ Pre-Qualification of Consultants

The procuring agency is liable for short-listing and pre-qualification of the consultants. The procuring agency shortlist those consultants who have relevant necessary qualification and experience. The criteria for short-listing should be very clear. After preparing short-list, all consultants should be informed that whether or not they have been short-listed. The criteria for short listing and pre-qualification of consultants are shown in figure 2.10. Evaluation criteria for short-listing of consultants/ firms are further described at appendix-VII.

PPRA –Procurement of Consultancy Services Regulations, 2010

Regulation 6: Criteria for short-listing of consultants:-

1) The procuring agency shall pre-determine short-listing criteria before invitation for expression of interest. For single source selection method, minimum three consultants

shall be selected but there is no maximum limit. The proposal may be considered on merit, if the consultants are less than three.

2) Following factors are of key consideration for the procuring agency, while short-listing the consultants;

a) Qualification of consultants

b) Experience of consultants

c) Any other factor deemed to be necessary by PPRA.

3) After short-listing, all consultants should be informed that whether or not they have been short-listed.

Regulation 7: Criteria for pre-qualification of consultants:-

1) Prequalification of consultants is very important in case of complicated projects.

2) Following factors are of key consideration for the procuring agency, while short-listing the consultants;

a) Qualification of consultants

b) General experience of consultants

c) Specific experience of consultants

d) Past performance of consultants

e) Any other factor deemed to be necessary by PPRA.

Figure 2.10: Criteria for short-listing and pre-qualification

2.9.7 Request for Proposal

The procuring agency after short-listing the consultants, ask consultants to submit technical and financial proposal in separate sealed envelope. The criteria for evaluation of technical and financial proposal shall be clearly defined in the RFP for the guidance of consultants. The procuring agency gives adequate time to consultants for the submission of proposal. Proposal received after the deadline will be return back unopened. The regulation for RFP is shown in figure 2.11.

PPRA – Procurement of Consultancy Services Regulations, 2010

Regulation 8: Request for proposals:-

1) The procuring agency asks the consultants to submit their technical and financial proposal vide RFP. Request for proposal shall include the following.

a) **Letter of invitation.** The letter of invitation shall clearly declare the name and address of the procuring agency. The letter of invitation shall describe purpose of the procuring agency for involvement of consultancy services.

b) **Instruction to consultants.** The instructions to consultants shall include all basic information that would helpful to consultants for preparing responsive technical and financial proposals.

c) **Terms of reference.** Terms of reference shall clearly define the objectives, and scope of the project. Terms of reference shall consist of list of services to be provided by the consultants.

d) **Evaluation criteria.** Evaluation of proposals shall be carried out as per the described selection method of consultants.

e) **Type of contract** – The procuring agency may use lump sum contract, time based contract, hourly or daily based contract depending on the nature of the project. The procuring agency may use any other type of contract for the economy and efficiency of the project.

f) **Proposed contract format** – The procuring agencies should suggest a draft sample contract format in RFP.

g) **Special provisions** – The procuring agency may put any special provision depending on the nature and complication of the project.

Figure 2.11: Request for proposal

2.9.8 Evaluation of Proposal

There are two types of proposal i.e. technical and financial proposal. Consultants were asked to submit these two proposals in two separate sealed envelopes according to the set pattern as described in detail in RFP. Technical proposal is opened first, while financial proposal remain unopened. After the evaluation of technical proposal, financial proposal is opened in the presence of the consultant's representative in public. Non responsive are rejected at technical preliminary stage and after the opening of financial proposals. The evaluation of proposal is shown in figure 2.12.

Precise evaluation of consultants consists of three stages.

1. A preliminary screening of consultants is being carried out by the procuring agency according to the format describe in RFP. The consultants does not meet the basic requirements are rejected.
2. A detailed evaluation is done by using the format described in the RFP. The consultants are awarded with technical score to assess the quality of proposals. The consultants who have achieved required technical score are recommended for the financial opening and evaluation.
3. Financial proposal is opened in public in the presence of consultant's representative. Financial proposal is to examine the cost of the proposal. The successful consultant is recommended for the contract award.

Figure 2.12: Evaluation of proposal

2.9.9 Contract Negotiations

According to PPRA regulation 10, Contract Negotiation is the negotiation held between the procurement agency and the selected consultants regarding work methodology, payment term, mode of payment/ advance payment and other similar issues. Contract negotiation does not mean contract or price negotiation. The minutes of the negotiation is recorded by the procuring agency. Negotiating by single person of the procurement agency is never allowed.

2.9.10 Contract Award

After contact negotiation the procurement committee awards the contract to consultants. The contract documents consist of the following.

a. Contract is formally awarded to the selected consultant with a notice to proceed with work.
b. The signed minutes of negotiation are always at top in priority of documents.
c. The CVs of the staff is finalized after changes if any.
d. The approved cost or price estimate consisting of contingency.
e. Payment schedule
f. The TOR
g. Any other annexes deemed necessary by the procuring agency

Evaluation criteria for awarding a contract to consultants/firms are further described at appendix-VIII.

2.9.11 Disbursement of Consultants

Payments are made to the consultants according to the contract. The owner or client has the record of all the payments made to the consultant either monthly, quarterly or as agreed in the contract. These payments are made against the consultant invoices. Owner or client verifies whether payment to consultant is claimable or not. After verification the invoice is forwarded to the finance department for approval and further payment to the consultant. When all the payments have been made to the consultants according to the contract, the consultants are disbursed subject to meet their satisfactory services for which they are hired.

2.10 CONCEPT OF DESIGN VETTING

A design vetting is an independent vetting of detailed design and contract documents by a third party design firm who review according to local building code, adherence to standards of design practice and design criteria, minimizing interface issues. The vetting may include review of design loads, compatibility of materials, soil investigation report and corrosion impact. (Club manager association of America University, 2005)

Design vetting can be defined as a comprehensive review of the design and constructability/ built-ability of a construction project by an independent third party, which has rich experienced in the fields of design and construction. Design vetting start with reviewing the plans and specifications for conformance with local building codes and standards of practice with respect to construction as well as detecting and minimizing interface issues. Design vetting is start during the project design phase in order to eliminate the potential defects in construction before the execution of project, which often results in claim and rise in project cost. (American institute of Architects)

By reviewing the project plans and specifications, we are usually able to see possible problem areas that have historically resulted in major causes of failure. Some of the more prevalent construction defects producing areas of the building construction process are the result of: improper design, non-compatibility of materials; faulty and

problematic wall to window conditions, roof to flashing tie-ins, waterproofing/damp roofing-related issues, soils-related problems that include subsidence or expansive soils issues, and sulfate and galvanic corrosion attack. The most prompt time to identify, address and eliminate these possible problem areas is prior to finalization of the project specifications, typically during the design phase.

2.11 PROJECTS WITH SAME AND DIFFERENT CONSULTANTS

There are many projects in Pakistan where design and supervision services are provided by same consultant either as an individual or in joint venture. Similarly there are many examples of projects where design and supervision services are provided by different consultants. List of few major projects is shown in Table 2.1.

Table 2.1: Project with same and different consultants

Projects with same design and supervision consultant	**Projects with Different design and supervision consultant**
M-1 (Peshawar -Islamabad Motorway) Consultants: ECIL,EA,AA Associates, SMEC	M-2 (Islamabad-Lahore Motorway) Design Consultants: REC,Loya,Peal,Butchler Supervision consultants: SMEC
Coastal Highway (Hub to Jiwani) Consultant: NESPAK	M-3 (Pindi Battian-Faisalabad Motorway) Design consultant: NESPAK Supervision consultants: EA, EGC
Coastal Highway (Rakni to Qilla Saif ullah) Consultant: NESPAK	M-4 (Faisalabad-Multan Motorway) Design consultant: NESPAK Supervision consultants: Rinadhert, HPL
Murree Express Way (Islamabad to Murree) Consultants: NESPAK	New Islamabad International Airport Fateh Jang Design consultant: NESPAK,ADPI,CPG Supervision consultants: LBG, ECIL
Kashmir Highway Islamabad Consultant: ACC	Centaurus (Hotel and apartments) Islamabad Design consultant: W.C Atkin Supervision consultants: Projacs, EA

Zero-point Interchange Islamabad Consultant: ECIL	Pakistan Housing Authority Residential Apartment Islamabad Design consultant: Rehman sohail Supervision consultants: Techred
Chandni Chowk and 6th Road flyover Rawalpindi Consultant: EA	COMSATS faculty blocks Islamabad Design consultant: Designmen Supervision consultants: Naqvi & sadiqque
FFC Head office Rawalpindi Consultant: Minehart	Gold Crest Al-ghurair Giga (High rise Apartments) Rawalpindi Design consultant: Mushtaq & Bilal, The architects Supervision consultants: PES

2.12 SUMMARY

The construction project consulting service is very important and play key role to the project lifecycle. When the project sponsor or owner likes to start a project, he should analyze that who will be responsible for design work and who will be responsible for supervision work. Should he let the work to one consultant firm keeping in mind that the consultant can provide the service of both i.e. design and supervision work or should he let the work to different entities. Consultant plays very important rule in the successful completion of the work. There are different types of consultants e.g. lead consultants, financial consultants, legal consultants, and technical consultants. Each type of consultants has unique role and services. The services provided by the consultants may include pre-investigation studies, detailed engineering design, project implementation and special services. The consultants are basically hired by the owner to fill up the gap of expertise which exists in the owner. The consultant's services cost is only 3 to 4 percent of the project lifecycle cost, yet their selection plays vital rule in the success of the project. Different methods are documented for procurement of services of consulting firms which include quality based selection, quality as well as cost selection, least cost selection, fixed budget selection, and single source selection method.

The most preferred an appropriate method is quality and cost based selection, as this method ensures the max efficiency and economy. Quality-based methods are

normally considered useful for complicated projects. After having selected the most appropriate Consultant, Client enters into a contract. After signing of contract, efficient contract administration is vital for obtaining the desired objectives out of consulting contract. A design vetting is an independent vetting of detailed design and contract documents by a third party design firm who review according to local building code, adherence to standards of design practice and design criteria, minimizing interface issues.

Chapter 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter describes the research methodology adopted for this study. Research strategy shows how the researchers are going to perform and accomplish their study to reach and attain research objectives (Saunders *et al.,* 2007). Questionnaire survey and interviews methods are adopted for the collection of data for this study.

This research is carried out for study of merits and demerits of appointing same design consultant as supervision consultant in the construction industry in Pakistan. Schematic layout of the research methodology used in this research is given in figure 3.1. After the preliminary study, detailed literature review is carried out.

After the pilot study, the questionnaire is further reviewed and adjustments to make it suitable for the construction industry in Pakistan. Final questionnaire is comprised of five sections project phases i.e. project initiating phase, project planning and design phase, project execution phase, project monitoring and control phase, and project closing phase (PMBOK 4th Edition). Total 42 questions are asked in a questionnaire excluding respondent personal information. Project initiating phase consists of 03 questions, project planning and design phase consists of 13, project execution phase consists of 17 questions, project monitoring and control phase consists of 05 questions and project closing phase consist of 03 questions. Complete questionnaire is displayed at appendix-IX. The above mentioned distribution of questions among these project phases depends upon involvement of financial cost in each phase. For example more finance is involved in project execution phase. Each question has three options i.e. Merit, Demerit and Not Sure. Respondents are asked to choose only one option out of three.

The checklist format is adopted for the development of questionnaire. The checklist format is a quick format but can be rather rigid. The response to each question does not have a degree of intensity, but a dichotomy. As an attribute, it is either applicable or not. The checklist questions are specially designed for a group of

respondents who have accurate information and can answer the questions with a high degree of certainty. (Naoum, 2007)

The questionnaire is distributed to engineers and architects who used to work with different firms registered with Pakistan Engineering Council (PEC). Total 175 questionnaires are sent out to the respondents for their response, out of 175 questionnaires, 103 are received. Final analysis was carried out on 98 valid questionnaires by excluding 05 incomplete questionnaires. Respondents to this survey include 28 clients, 40 consultants, 25 contractors and 05 academia/researchers.

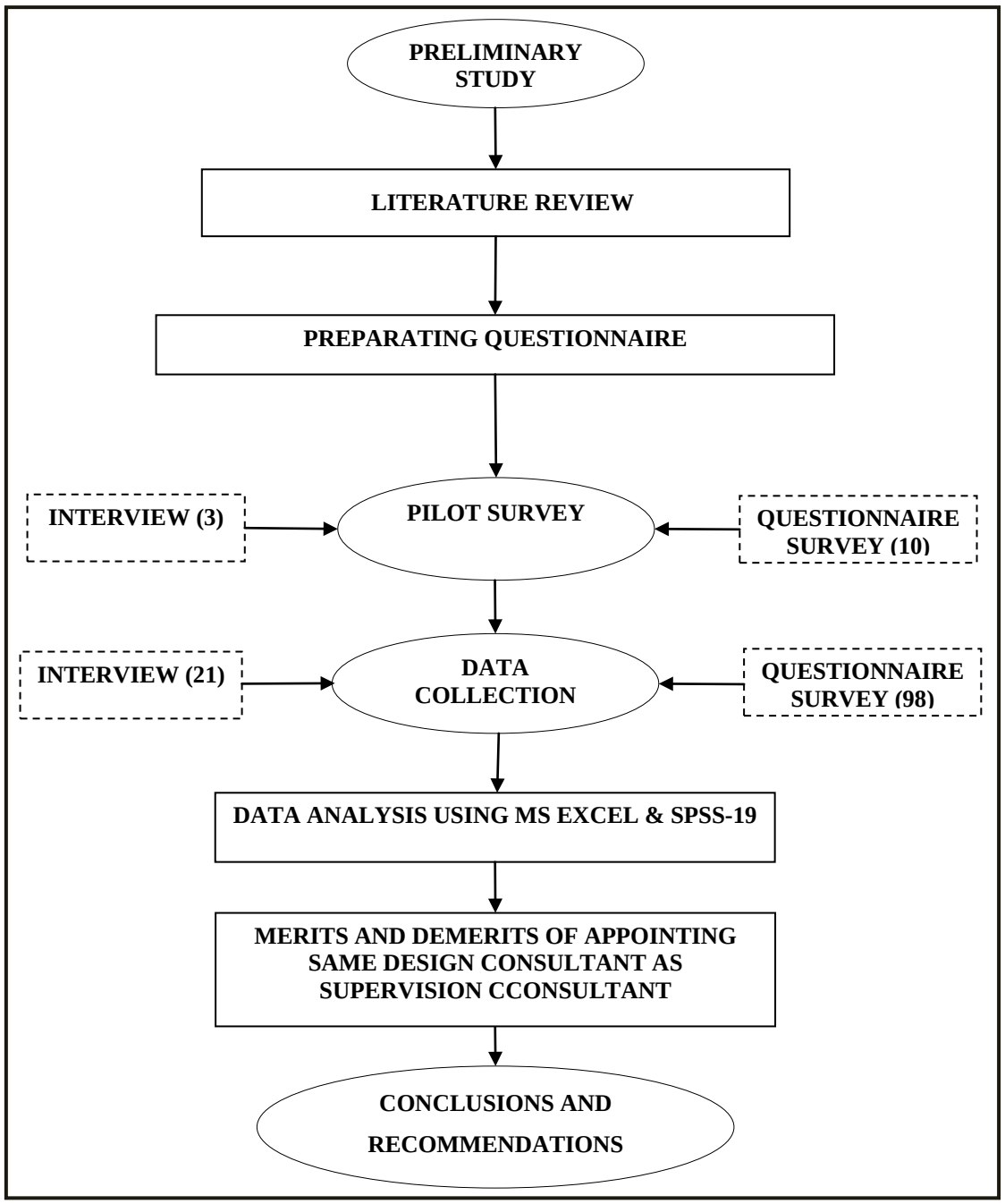

Figure 3.1: Research methodology

The collected data is analyzed using MS Excel and Statistical Package for the Social Sciences (SPSS-19). The data is nominal (categorical) data; the response to each question include Merit, Demerit, Not Sure does not have a degree of intensity, but a dichotomy, hence we cannot calculate mean, median, standard deviation, dispersion, and perform normality test, and inferential statistics. It is meaningless to calculate the mean and standard deviation for this data, like we cannot get the mean of gender, either it is male or female. For this study descriptive statistics method including frequency distribution, percentages, ratio, bar charts, pie charts and mode is carried out. The frequency distribution of each question is calculated separately. Total merits, demerits and not sure are mathematically calculated in term of their respective frequency and percentages. Overall ranking of all questions is done against merit, demerits and not sure according to their percentages (frequencies).The question with higher frequency (percentage) is rank as 1. Overall ranking was carried out for each phase of project against merit, demerits and not sure. Response of the firm type (attribute) was carried out in term of frequencies and percentages. Top three merits, demerit and not sure was calculated for firm type (owner or client, consultants, contractor and academia or researchers).

3.2 RESEARCH DESIGN

The research objectives have been explained in detail in 1st chapter. Research design is an action plan for getting from 'here' to 'there', where 'here' may be defined as the initial set of questions to be answered, and 'there' is some set of conclusion (answers) about these questions. Between 'here' and 'there' may be found a number of major steps, including the collection and analysis of relevant data (Yin, 1994). Research strategy can be defined as the way in which the research objectives can be questioned. During selection of an appropriate method for research, it is compulsory to consider the connection between data collection and its analysis, keeping in mind that main questions have been addressed with their results.

In this study, questionnaire survey is administered as it is the most appropriate method for this kind of study (Naoum, 2007). For the design of questionnaire, the checklist format is adopted. The checklist format is a quick format but can be rather rigid. The response to each question does not have a degree of intensity, but a dichotomy. As an

attribute, it is either applicable or not. The checklist questions are specially designed for a group of respondents who have accurate information and can answer the questions with a high degree of certainty. Other methods, such as interviews are chosen as supplement to validate the questionnaire survey.

Data is analyzed using MS Excel and SPSS-19. The response to each statement/question is calculated in term of frequency (percentage) of Merit, Demerit and Not Sure. Response of the firm type (attribute) was carried out in term of frequencies and percentages. Top 3 merits, demerit and not sure was calculated for firm type (owner/client, consultants, contractor, and academia/researchers).

3.3 SAMPLE SELECTION

The purpose of statistics is to have summary measure about some characteristics of the population through sampling. In all cases a sample has to be drawn from its population. The term 'sample' means a specimen or part of whole (population) which is drawn to show what the rest is like (Naoum, 2007).

The sample for this research is selected from a population of construction enterprises in Pakistan. According to PEC statistical data, the number of construction establishments registered with PEC until January 2013, reached 30000 but not all of them are executing construction projects. It is a large population and the sample selection will represent various construction experts including clients, consultants and contractors with different categories and backgrounds.

The questionnaire was distributed to 175 randomly selected potential respondents. Main focus of the survey was on buildings, infrastructure and roads, bridges /flyovers, runways, dams/hydal power/canals, communication civil work, tunnel and transmission line projects. Responded were remained involved in the following type of projects throughout their Professional experienced; buildings (69), infrastructure and roads (58), bridges /flyovers (31), runways (18), dams/hydal power/canals (10), communication civil work (1), tunnel (1) and transmission line (1). Respondents are qualified and experienced. Around 38.8% (38) of the respondents have 0-5 years of experience, 21.4% (21) having 6-10 years construction experience, 19.4% (19) having 11-15 years construction experience, 10.2% (10) having 16-20 years construction experience and 10.2% (10) having

greater than 20 years of construction experience. Therefore the information provided by these professionals is quite reliable.

3.4 SAMPLE SIZE

Factors that should be taken into account for determining an appropriate sample size are:

a. Population size
b. Sampling error
c. Confidence level

Equation (3-1) provides formula to calculate the sample sizes (Dillman, 2000):

$$Ns = [(Np)(P)(1-P)] / [(Np-1)(B/C)^2 + (P)(1-P)] \quad \text{.....(3-1)}$$

Where;

Ns: sample size for the desired level of precision

Np: population size i.e. 30000

P: proportion of the population that is expected to choose one of the responses Categories (yes/no); P = 0.5

B: acceptable sampling error; (±10% or ±0.10)

C: Z statistic associated with the confidence level (1.96 corresponds to 95% confidence level)

Acceptable sample sizes for various populations with different sampling errors for 95% confidence level are given in table 3.1. These sample sizes can also be calculated using the formula given in equation (3-1).

Table 3.1: True sample size

Completed sample sizes needed for various population sizes and characteristics at three levels of precision.

	Sample size for the 95% confidence level					
	±10% Sampling Error		±5% Sampling Error		±3% Sampling Error	
Population Size	50/50 split	80/20 split	50/50 split	80/20 split	50/50 split	80/20 split
100	49	38	80	71	92	87
200	65	47	132	111	169	155
400	78	53	196	153	291	253
600	83	56	234	175	384	320
800	86	57	260	188	458	369
1,000	88	58	278	198	517	406
2,000	92	60	322	219	696	509
4,000	94	61	351	232	843	584
6,000	95	61	361	236	906	613
8,000	95	61	367	239	942	629
10,000	95	61	370	240	965	640
20,000	96	61	377	243	1,013	661
40,000	96	61	381	244	1,040	672
100,000	96	61	383	245	1,056	679
1,000,000	96	61	384	246	1,066	683
1,000,000,000	96	61	384	246	1,067	683

Source: *(Dillman, 2000)*

Sample size can also be determined by using equation (3-2) (Shash and Abdul-Hadi, 1993):

$$\mathbf{n = n' / (1 + n' / N)} \ldots\ldots\ldots\ldots\ldots\ldots \quad (3\text{-}2)$$

Where;

n: sample size from finite population

N: total population

n': sample size from infinite population, which can be calculated as $n'=S^2/ V^2$

S^2: standard error variance of population elements = P (1-P); maximum at P=0.5

V: standard error of sample population = 0.05 for confidence level 95%

There were 98 valid replies out of 175 showing an overall response rate of 56%. In the construction enterprises, a good response rate is around 30% (Black *et al.*, 2000). Therefore, the response rate in this research is acceptable. The sample size

is 98 for this survey, however to know whether or not this sample size truly represents the population, table 3.1 is used which exhibits sample sizes required for various population sizes and characteristics at three level of precision. These values can be verified using the formulae given in equations (3-1) and (3-2).

Until January 2013, more than 30000 construction establishments have been registered with PEC. This number can be used as the population size. Confidence level is selected as 95%. It is also assumed that the answers will be homogeneous and will set the p value to 0.5 (means that probability of occurrence is 50%). Using a fifty-fifty split maximizes the question variance, which requires the largest possible sample to control for the differences among the response options. By applying these values in equations (3-1) and/or (3-2), the sample size comes out to be 96 for a sampling error of ±10%. Hence a sample comprising of 98 Respondents is quite reliable for further analysis.

3.5 CHARACTERISTICS OF GOOD QUESTIONNAIRE

The characteristics of a good questionnaire can be summarized as (Wood, 1991; cited in Naoum and Coles, 1997):

- It must deal with a topic of some significance that is important enough to the respondents to merit a response.
- It must seek information not obtainable from other sources. We should not ask people to do our data gathering for us especially when the data is readily available elsewhere.
- It should be as short as possible but comprehensive enough to allow us

To derive what we need without alienating the respondent.

- It should be attractive in appearance, well laid out and well reproduced.
- Where it contains directions they must be clear and complete.
- Unless there is a very good reason for another format, questions should be arranged in categories which allow easy and accurate responses.
- Questions must be as objective as possible without offering leading questions.
- In their sequencing, questions should run from the general to the specific, from simple to complex, and from those that will create better impression upon the respondent to those that may be sensitive.

- We should avoid questions that may annoy or embarrass the respondent.
- The questionnaire must provide for ease of tabulation and or interpretation, and should be designed accordingly.

3.6 SUMMARY

Questionnaire survey is adopted as the main research instrument. In this chapter, the research method, design, sampling techniques and design of the survey are discussed. Above of this entire chapter disclose a clear understanding of the research methodology used in research. MS-Excel and SPSS-19 are used for the statistical analysis of data.

Chapter 4

DATA ANALYSIS AND RESULTS

4.1 INTRODUCTION

Data Analysis of 98 valid questionnaires was carried out by using MS Excel and SPSS-19. As described earlier chapter data is nominal (categorical) data. All stakeholder including clients, consultants, contractors and academia/researchers believe that, by appointing same design consultant as supervision consultant there are almost double merits than demerits. They all consider that for project lifecycle it is always better to appoint same design consultants as supervision consultants in the construction industry of Pakistan rather than having different consultants. The same design as supervision consultants could largely improve the efficiency and performance of construction project, which will be the development direction in the consulting service.

The stakeholder emphasizes that let the design work and the supervision work to one consulting company/firm with corresponding qualification and capacity (i.e. the company can provide the combination service of design and supervision). In practice, the separation of design and supervision would hinder the design firm and the supervision body to provide more effective project consulting service, and hinder the development of the project consulting industry.

Design and supervision service should be simultaneously provided by one consulting engineer, because it is not appropriate to employ different professionals for these two kinds of service with close relationship. When owner selects the design service, supervision service should be taken into consideration at the same time.

If one entity takes in charge of design and construction supervision, the project performance could be improved and nobody could escape the obligation, the integration of design and supervision service could guarantee the final quality, efficiency, and value of construction project and reduce the disputes between contractor and owner. The innovation and development of the project consulting service all request that the design company and the supervision company with capacity could provide better combination service of design and supervision in more wider range.

4.2 CHARACTERISTICS OF RESPONDENTS

4.2.1 Grouping of Respondents by Gender

There are 98 valid responses out of 175, showing a response rate of 56%. Response by male is 94.9 % and female is 5.1 %. Grouping, frequencies, percentages and cumulative percentage of respondents by gender are shown in table 4.1 and figure 4.1.

Table 4.1: Grouping of respondents by gender

Respondents Gender	No of Questionnaires Returned	Percentage of Respondent	Cumulative Percentage
Male	93	94.9	94.9
female	05	5.1	100
Total	98	100	-

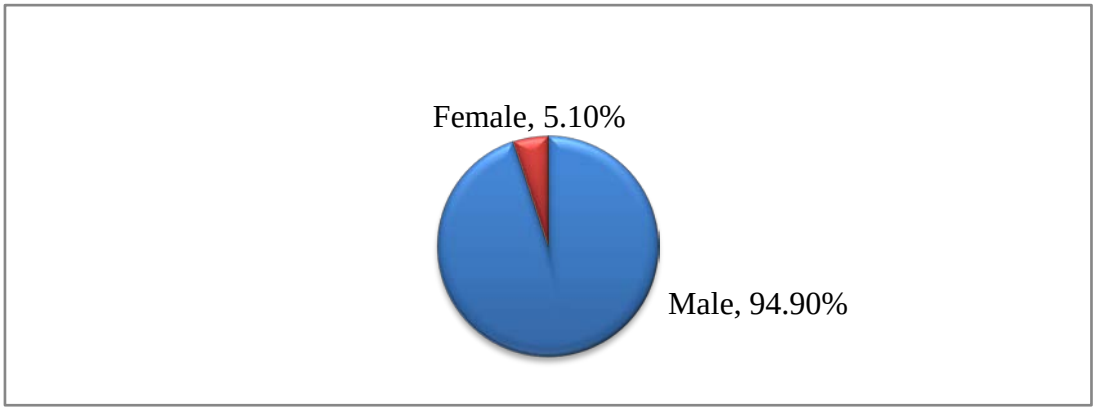

Figure 4.1: Grouping of the respondents by gender

4.2.2 Grouping of Respondents by Qualification

Respondents to this survey belong to the level of qualification. Response by doctorate (PhD) is 0 %, master degree 52%, bachelor degree 42.9%, B-tech (Honor) 1%, and diploma holder 4.1%. Grouping and frequencies (percentages) of respondents by qualification are shown in table 4.2 and figure 4.2.

Table 4.2: Grouping of respondents by qualification

Respondents Qualification	Frequency of Respondents	Percentage of Respondents	Cumulative Percentage
Doctorate(PhD)	00	00	00
Master Degree	51	52	52
Bachelor Degree	42	42.9	94.9
B-Tech (Honor)	01	1.0	95.9
Diploma Holder	04	4.1	100
Total	98	100	-

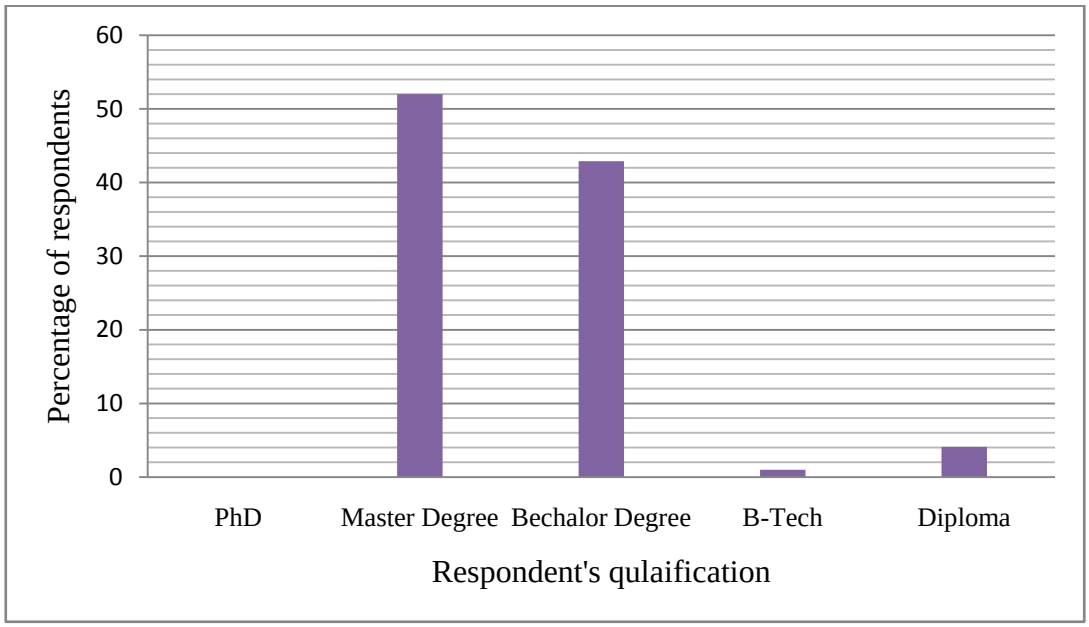

Figure 4.2: Grouping of the respondents by qualification

4.2.3 Grouping of Respondents by Firm Type

Response by owner/Client is 28.6 %, consultants 40.8%, contractor 25.5%, sub-contractor 0%, and academia/researcher 5.1%. Grouping and frequencies (percentages) of respondents by their firm type are shown in table 4.3 and figure 4.3.

Table 4.3: Grouping of respondents by firm type

Respondents organization/firm type	Frequency of Respondents	Percentage of Respondents	Cumulative Percentage
Owner/Client	28	28.6	28.6
Consultant	40	40.8	69.4
Contractor	25	25.5	94.9
Sub-Contractor	00	0	94.9
Academia/Researcher	05	5.1	100
Total	98	100	-

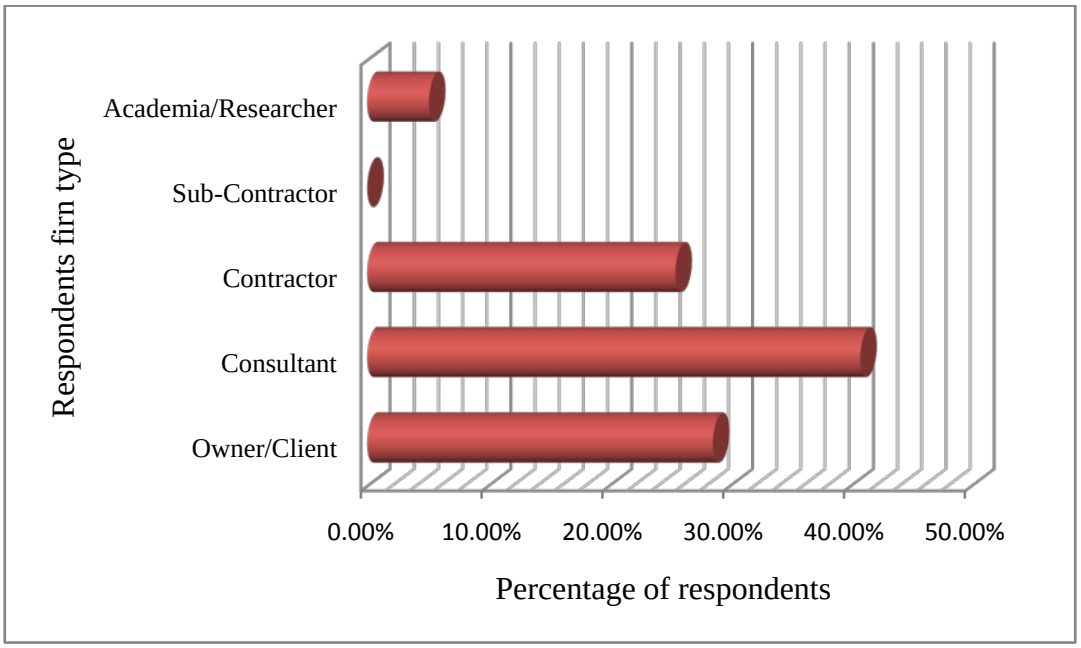

Figure 4.3: Grouping of respondents by firm type

4.2.4 Grouping of the Respondents by Firm Sector

Response by govt. sector is 28.6 %, private sector 65.3%, university/Colleges 5.1%, and semi government 5.1%. Grouping and frequencies (percentages) of respondents by their firm type are shown in table 4.4 and figure 4.4.

Table 4.4: Grouping of respondents by firm sector

Respondents organization/Firm	Frequency of Respondents	Percentage of Respondents	Cumulative percentage
Govt.	28	28.6	28.6
Private	64	65.3	93.9
university/College	5	5.1	99.0
semi government	1	1.0	100.0
Total	98	100.0	

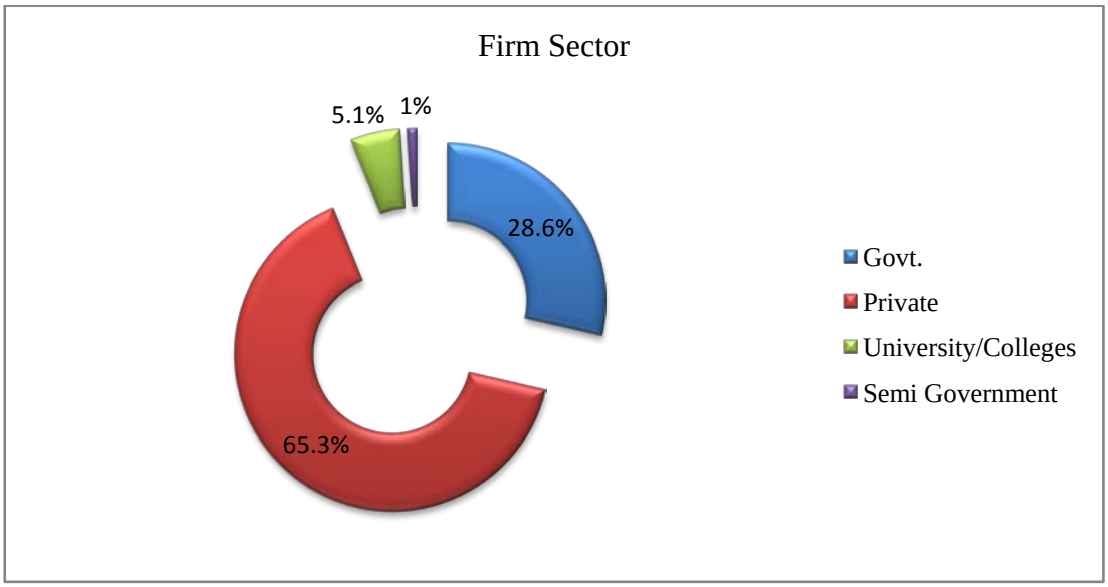

Figure 4.4: Grouping of respondents by firm sector

4.2.5 Respondents Position in Firm

Responses to this survey belong to the position of respondents in their firm or organization. Response by managing director is 6.1 %, project director/manager 15.3%, deputy project director/manager 8.2%, project engineer/architect/planner 38.7%, construction manager 4.1%, site supervisor 9.2%, professor/lecturer 3.1%, design engineer 4.1%, manager contracts 3.1%, resident engineer 3.1%, student 2.0%, SDO (sub-divisional officer) 2.0%, and quantity surveyor 1.0%. Grouping and frequencies (percentages) of respondents by their position in origination or firm are shown in table 4.5 and figure 4.5.

Table 4.5: Respondents position in firm

Respondents position in organization/Firm	Frequency of Respondents	Percentage of Respondents	Cumulative percentage
Managing Director	6	6.1	6.1
Project Director/manager	15	15.3	21.4
Deputy Project director/Manager	8	8.2	29.6
Project Engineer/Architect/Planner	38	38.7	68.4
Construction Manager	4	4.1	72.4
Site Supervisor	9	9.2	81.6
Professor/Lecturer	3	3.1	84.7
Design engineer	4	4.1	88.8
Manager Contracts	3	3.1	91.8
Resident Engineer	3	3.1	94.9
Student	2	2.0	96.9
SDO	2	2.0	99.0
Quantity Surveyor	1	1.0	100.0
Total	98	100.0	

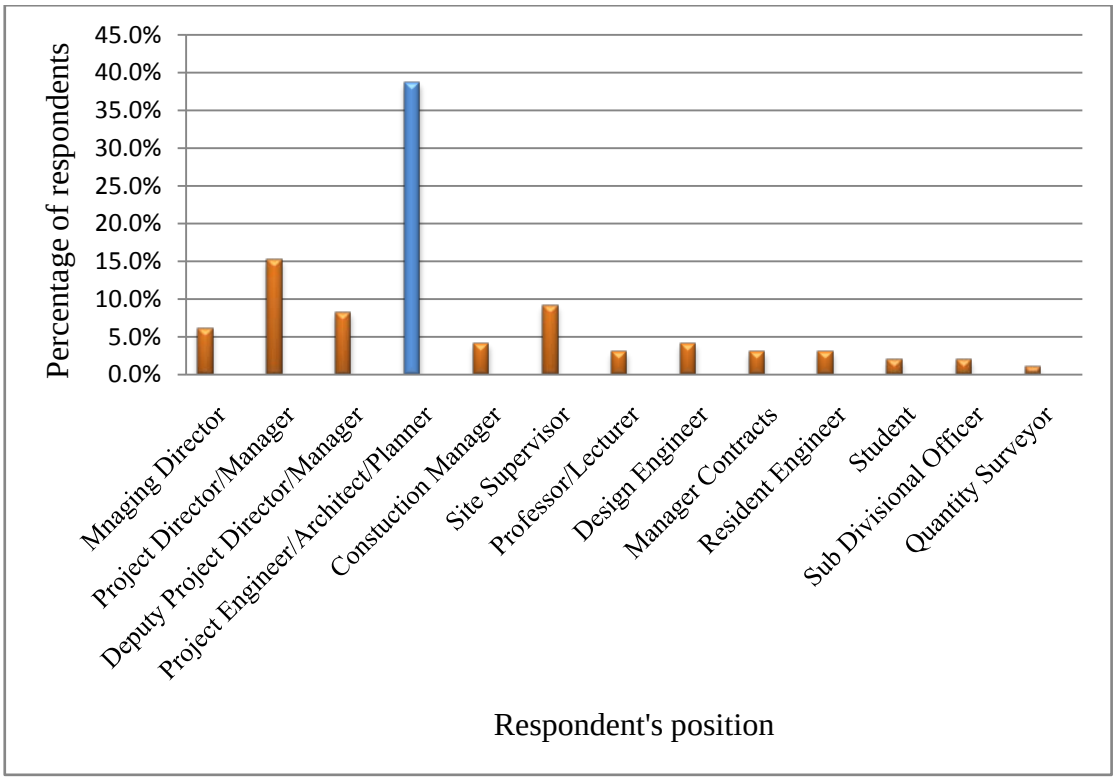

Figure 4.5: Respondents position in firm

4.2.6 Grouping by Professional Experience

Respondents to this survey belong to the level of professional experience. Response by 0-5 years professional experience is 38.8 %, 6-10 years 21.4%, 11-15 years 19.4%, 16-20 years 10.2%, and >20 years 10.2%. Grouping and frequencies (percentages) of respondents by their professional experience are shown in table 4.6 and figure 4.6.

Table 4.6: Grouping by professional experience

Respondents Professional Experience(Years)	Frequency of Respondents	Percentage of Respondents	Cumulative percentage
0-5	38	38.8	38.8
6-10	21	21.4	60.2
11-15	19	19.4	79.6
16-20	10	10.2	89.8
>20	10	10.2	100.0
Total	98	100.0	

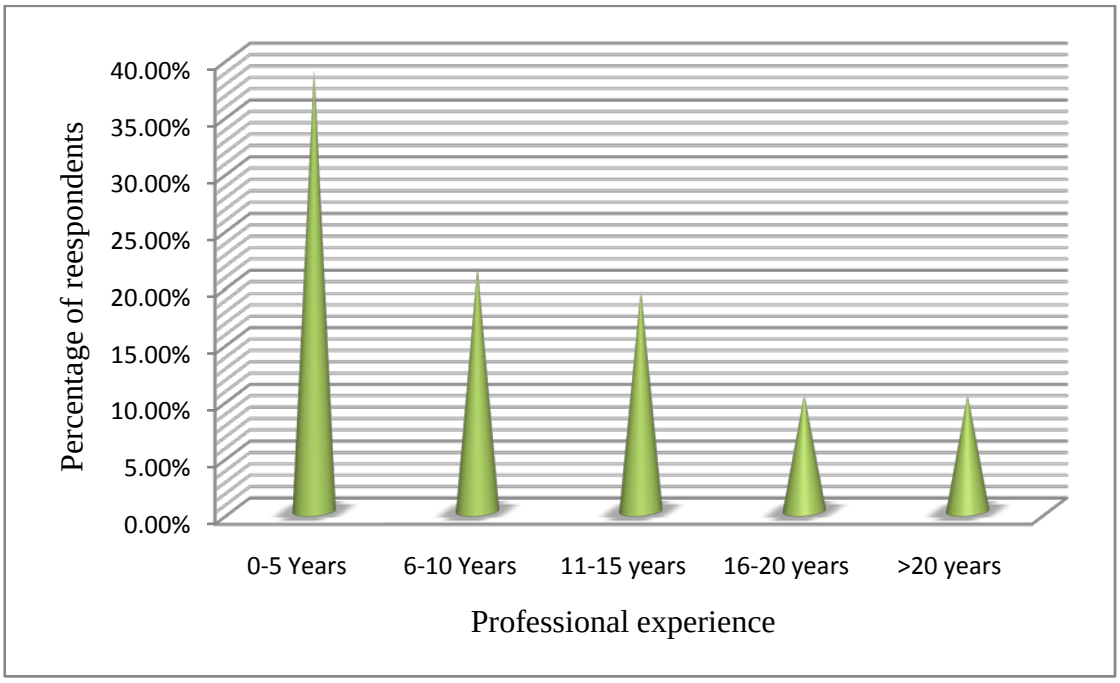

Figure 4.6: Grouping by professional experience

4.2.7 Grouping by Construction Type

Respondents to this Survey belong to the construction type. Response by respondents involved in the project of building are 69, infrastructure and roads 58, bridges/flyovers 31, runways 18, dam/hydal power/canals 10, communication civil work 1, Tunnel 1, and transmission line 1. Grouping and frequencies (percentages) of respondents by construction type are shown in figure 4.7.

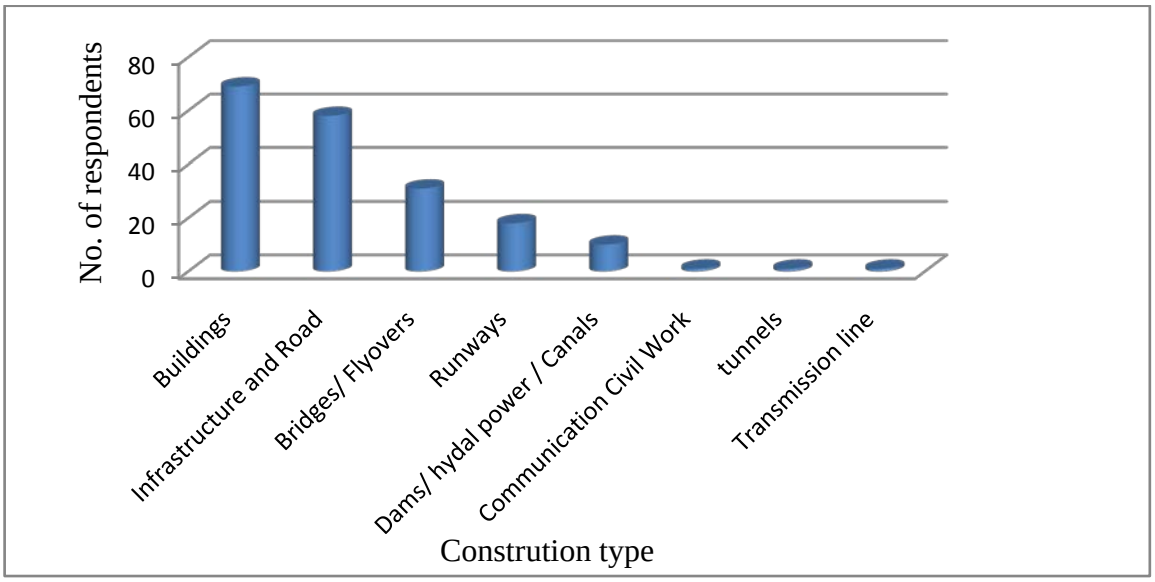

Figure 4.7: Grouping by construction type

4.2.8 Grouping by Project Cost

Response by respondents involve in project worth or cost of <100 Million is 12.2%, 100-500Million 24.5%, and > 500 Million 63.3%. Grouping and frequencies (percentages) of respondents by Project cost or worth are shown in table 4.7 and figure 4.8.

Table 4.7: Grouping by project cost

Respondents Project Cost/Worth	Frequency of Respondents	Percentage of Respondents	Cumulative percentage
<100 million	12	12.2	12.2
100-500 million	24	24.5	36.7
>500 million	62	63.3	100.0
Total	98	100.0	

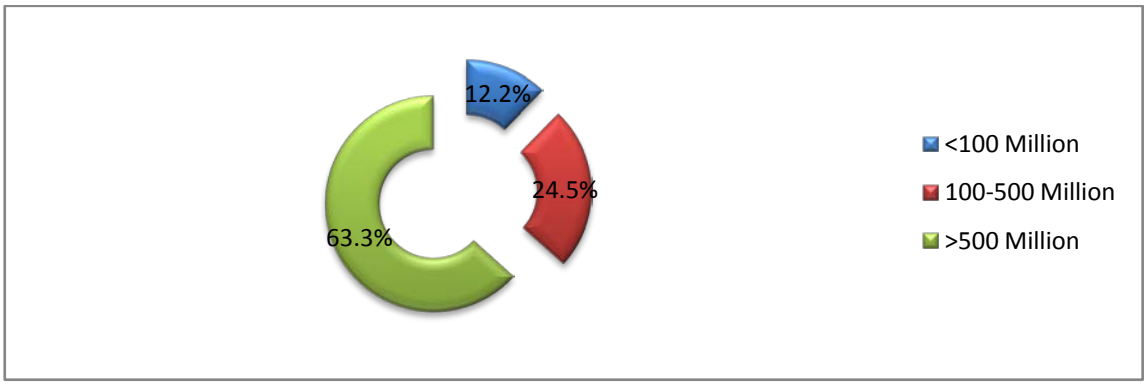

Figure 4.8: Grouping by project cost

4.2.9 Grouping by Employees in Firm

Responses by respondents having avg. no. of employees in their firm is <50 Nos. 13.3%, 50-100 nos. 21.4%, 100-500 nos. 26.5% and >500 nos.38.8%. Grouping and frequencies (percentages) of respondents by avg. no. of employees in their firm is shown in table 4.8 and figure 4.9.

Table 4.8: Grouping by employees in firm

Respondent Avg. Nos. of employees	Frequency of Respondents	Percentage of Respondents	Cumulative percentage
<50	13	13.3	13.3
50-100	21	21.4	34.7
100-500	26	26.5	61.2
>500	38	38.8	100.0
Total	98	100.0	

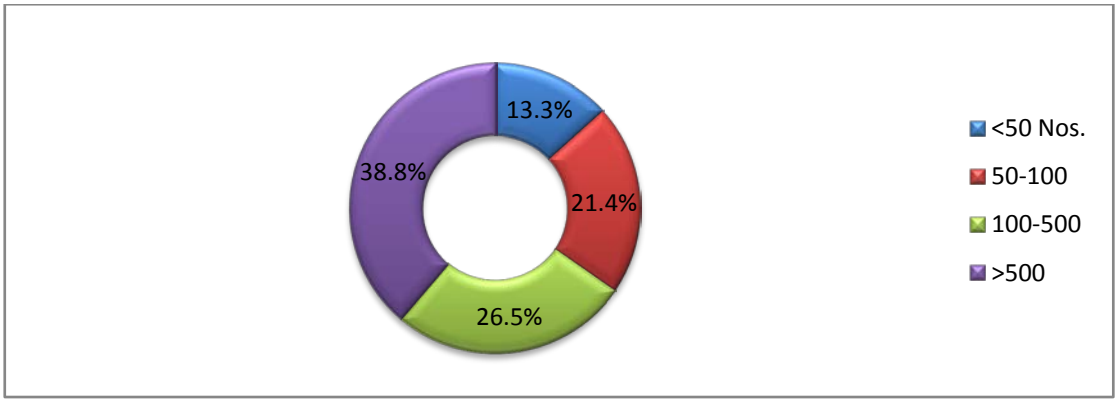

Figure 4.9: Grouping by employees in firm

4.2.10 Grouping by Organizational International Quality Certification

Responses by respondents for this survey were that either respondent's company has any international certification for quality. Response for "Yes" is 71.4% and "No" 28.6% .Grouping and frequencies (percentages) of respondents by their company's international certification are shown in table 4.9 and figure 4.10.

Table 4.9: Grouping by international quality certification

Organizational International Quality Certification	Frequency of Respondents	Percentage of Respondents	Cumulative Percentage
Yes	70	71.4	71.4
No	28	28.6	100
Total	98	100	-

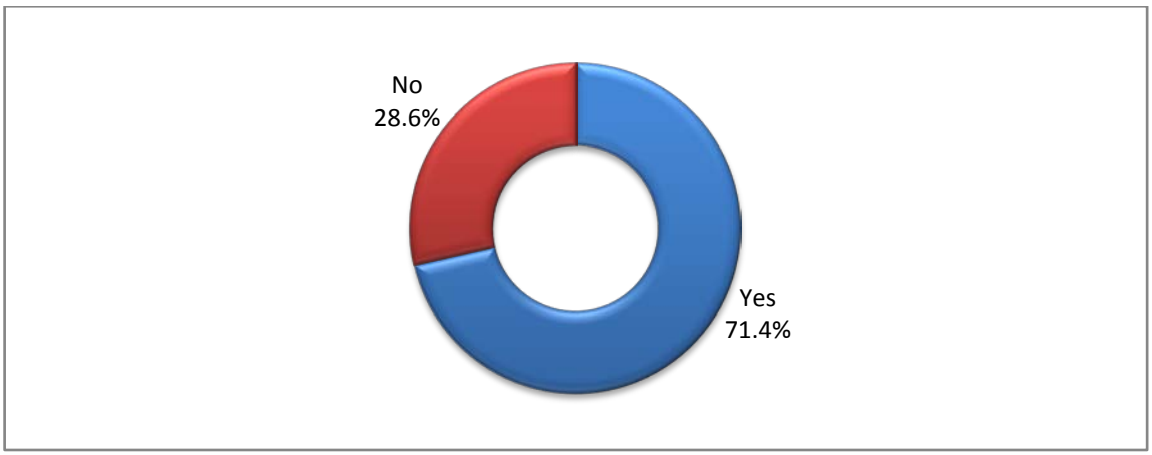

Figure 4.10: Grouping by international quality certification

4.3 STATISTICAL ANALYSIS

Total 175 questionnaires are sent out to the respondents for their response, out of 175 questionnaires, 103 are received. Final analysis was carried out on 98 valid questionnaires by excluding 05 incomplete questionnaires.

4.4 OVERALL RESPONSE BY RESPONDENTS

Overall response by the respondents in term of frequencies (percentages) for merit is 61%, demerit 28% and not sure 11% as shown in table 4.10 and figure 4.11. It is

very clear from data that the frequency (percentage) of merit is more than double the frequency (percentage) of merit. The ratio of merit to demerit is 2.17. Overall respondents strongly believe that it is better to appoint same design consultant as supervision consultant.

Table 4.10: Overall response by respondents

Questionnaires Reponses option	Overall Frequency of Respondents	Overall Percentage of Respondents	Cumulative Percentage	Merit/Demerit (Ratio)
Merit	2496	61	61	**2.17**
Demerit	1154	28	89	
Not Sure	466	11	100	
Total	4116	100	-	

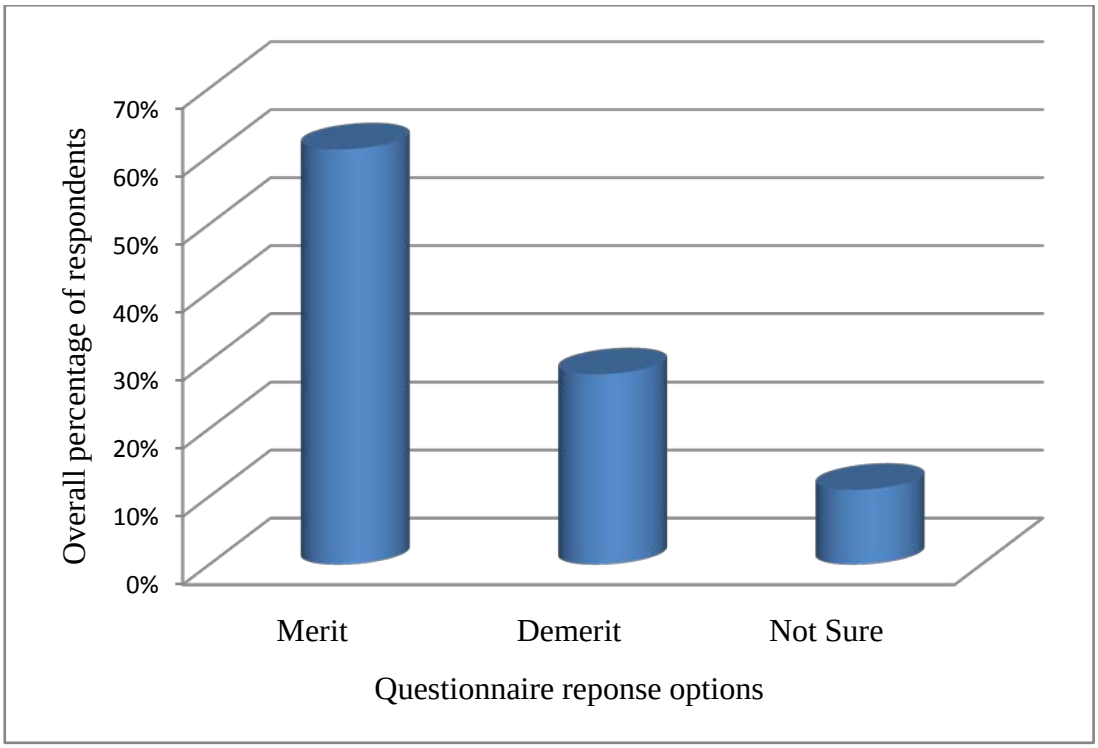

Figure 4.11: Overall response by respondents

4.5 OVERALL MODE OF RESPONDENTS

Mode of respondents shows that there are 31 merits and 11 demerits out of 42 questions asked from the respondents. It clearly indicate that , by appointing same design consultant as supervision merits are more than double of demerits as shown in table 4.11.

Table 4.11: Overall MODE of respondents

(By appointing same design consultant as supervision consultant)	**MODE**
Project scope can be managed well	1
Stakeholder's involvement the project can be well identified at initial stage	1
Consultants become fully conversant with the project history/back ground right from initial phase of the project	1
Comprehensive scope and parameters can be developed	1
Realistic feasibility report can be prepared	1
More realistic WBM can be developed	1
Execution stages sequencing and resource estimation can be done more appropriately	1
Estimated duration and cost of the project can be assessed more effectively	1
Practical construction schedule of the project can be developed in a better way	1
Risks/hazards can be identified more efficiently	1
Build-ability/ constructability in design can be well adopted.	1
Construction conflicts can be minimized	1
Ambiguities in the contract documents can be minimized	1
Project may become more cost efficient	1
Possible improvement in design may increase	1
Self-defiance of consultants may be camouflaged	2
There can be better interpretation of the contract documents	1
There will be comfortable coordination and communication between design and supervision team	1
Approval of construction methodology/material submittal/shop drawings may take less time	1

(By appointing same design consultant as supervision consultant)	**MODE**
Quick decision can be made during execution by eliminating the lengthy process	1
There may be quick response to the Request For Information(RFI) raised by the contractor	1
Possible variation/ change orders can be minimized	1
Contractor's claims may be reduced due to the input of both consultants in planning and design phase	1
Consultants will not put blames on each other	1
Contractor's resources compatibility with design changes may be given preference during execution	1
Correspondence/ Paper work between design and supervision consultant will reduce	1
Consultancy fee/charges of consultants will be reduced	1
Supervision may be comparatively relaxed	2
Both consultants may try to hide the design discrepancies during execution	2
Client is not taken into loop in communication between design and supervision team on project matters	2
Monopoly in consultant's decision may increase	2
Client's confidence to cancel the contract with consultants may reduce	2
Performance evaluation/ vetting out of the two consultants may become difficult for client	2
From client's perspective, consultants-contractor interaction can be considered doubtful	2
Project execution plans can be effectively applied within the scope	1
Smooth and efficient progress monitoring of the project can be done	1
There may be more realistic progress reporting and follow up	1
Client can be kept in dark by the consultants regarding quality/ defects	2
Consultants undue support to the contractor may lead to corruption	2
It may be easy to obtain acceptance from the client	1
Effective documentation of lessons learned can be prepared	1
Final review/report of the project may be biased	2

Mode 1 means that more than 50% respondents believe that, the statement asked in a question is merit if same design consultant is working as supervision consultant on a project. For example more than 50% respondents believe that, by appointing same design consultant as supervision consultant, project scope can be managed well and is merit.

4.6 OVERALL RANKING OF MERIT, DEMERIT AND NOT SURE

Overall response by respondents regarding merit, demerit, and not sure is ranked. All question of the questionnaire have been ranked. The questions with higher frequency are ranked as 1. Overall ranking of merit, demerit and not sure is shown in table 4.12, table 4.13, and table 4.14 respectively.

4.6.1 Overall Ranking of Merit

Overall response by respondents regarding merit is ranked. The question with higher frequency (percentage) is rank as 1. The frequency (percentage) of a question (By appointing same design consultant as supervision consultant, there will be comfortable coordination & communication between design and supervision team) is 90.8% and ranked as 1. It means that 90.8% respondents are thinking that by appointing same design consultant as supervision consultants, there will be comfortable coordination & communication between design and supervision team and rank it as top most merit out of 42 questions. The frequency (percentage) of a question (by appointing same design consultants as supervision consultant, consultants become fully conversant with the project history/back ground right from initial phase of the project) is 87.8% and ranked as 2. Similarly all the questions have been ranked according to their frequency (percentages) in term of merit as shown in table 4.12.

Table 4.12: Overall ranking of merit

(By appointing same design consultant as supervision consultant)	**Merit (%)**	**Ranking**
Comfortable coordination & communication between design and supervision team	90.8	1

(By appointing same design consultant as supervision consultant)	**Merit (%)**	**Ranking**
Consultants become fully conversant with the project history/back ground right from initial phase of the project	87.8	2
Project execution plan can be effectively applied within the scope	86.7	3
Project scope can be managed well	85.7	4
Approval of construction methodology/material submittal/shop drawing may take less time	83.7	5
More realistic WBM can be developed	79.6	6
Quick decision can made during execution by eliminating lengthy process	79.6	7
Stakeholder's involvement the project can be well identified at initial stage	78.6	8
Activities sequencing and resource estimation can be done more appropriately	77.6	9
Consultants teams will not put blame on each other	76.5	10
Construction conflicts can be minimized can be minimized	76.5	11
Correspondence between design and supervision team will reduced	75.5	12
Comprehensive scope and parameters can be developed	74.5	13
Practical construction schedule can be developed	74.5	14
Build-ability/constructability in the design can be well adopted	73.5	15
Contractor's claims may be reduced due to the input of both consultants team in planning and design phase	73.4	16
Smooth and efficient progress monitoring of the project can be done	72.4	17
There may be quick response to the RFI raised by the contractor	71.4	18
Consultancy fee/charges can be reduced	69.4	19
There can be better interpretation of the contract documents	66.3	20
Possible improvement in the design can be increased	65.3	21
Estimated duration and cost of the project can be assessed more effectively	65.3	22

(By appointing same design consultant as supervision consultant)	**Merit (%)**	**Ranking**
It may be easy to obtain acceptance from the client	64.3	23
Ambiguities in the contract can be minimized	63.3	24
There may be more realistic progress monitoring and follow up	62.2	25
Effective documentation of the lesson learned can be prepared	61.2	26
Possible variation/change orders can be minimized	61.2	27
Realistic feasibility report can be prepared	59.2	28
Contractor's resource compatibility with design changes may be given preference during execution	58.2	29
Project may become more cost efficient	57.1	30
Risks/hazards can be identified more efficiently	56.1	31
Supervision may be comparatively relaxed	37.7	32
Client's confidence to cancel the contract with consultant may reduce	35.7	33
Self defiance of the consultant may be camouflaged	30.6	34
Client can be kept in dark by the consultants regarding quality/defects	28.6	35
Consultants may try to hide design discrepancies during execution	28.6	36
Final review/report of the project may be biased	27.6	37
Client is not taken into loop in communication between design and supervision team on the project matters	27.6	38
Monopoly in consultant's decision may increase	26.5	39
Performance evaluation/vetting out of two consultants team may become difficult for client	26.5	40
Consultants undue supports to contractor may lead to corruption	26.5	41
Consultant-contractor interaction can be considered doubtful	26.5	42

4.6.2 Overall Ranking of Demerit

Overall response by respondents regarding demerit is ranked. The question with higher frequency (percentage) is rank as 1. The frequency (percentage) of a question (by

appointing same design consultant as supervision consultant, monopoly in consultant's decision may increase) is 68.4% and ranked as 1. It means that 68.4% respondents are thinking that by appointing same design consultant as supervision consultants, monopoly in consultant's decision may increase and rank it as top most demerits out of 42 questions. The frequency (percentage) of a question (by appointing same design consultants as supervision consultant, client can be kept in dark by the consultants regarding quality/defects) is 67.3% and ranked as 2. Similarly all the questions have been ranked according to their frequency (percentages) in term of demerit as shown in table 4.13.

Table 4.13: Overall ranking of demerit

(By appointing same design consultant as supervision consultant)	**Demerit (%)**	**Ranking**
Monopoly in consultant's decision may increase	68.4	1
Client can be kept in dark by the consultants regarding quality/defects	67.3	2
Consultants may try to hide design discrepancies	65.3	3
Final review/report of the project may be biased	62.2	4
Client is not taken into loop in communication between design and supervision team on the project matters	60.2	5
Performance evaluation/vetting out of two consultants team may become difficult for client	59.2	6
Consultants undue supports to contractor may lead to Corruption	58.2	7
Supervision may be comparatively relaxed	54.1	8
Consultant-contractor interaction can be considered doubtful	53.1	9
Self defiance of the consultant may be camouflaged	52.1	10
Client's confidence to cancel the contract with consultant may reduce	51	11
Risks/hazards can be identified more efficiently	27.6	12
Realistic feasibility report can be prepared	26.5	13
Ambiguities in the contract can be minimized	25.5	14
Possible improvement in the design can be increased	24.5	15

(By appointing same design consultant as supervision consultant)	**Demerit (%)**	**Ranking**
It may be easy to obtain acceptance from the client	24.5	16
There may be more realistic progress monitoring and follow up	24.5	17
Project may become cost efficient	24.5	18
Contractor's resource compatibility with design changes may be given preference during execution	22.4	19
Effective documentation of the lesson learned can be prepared	21.5	20
There can be better interpretation of the contract documents	20.4	21
Possible variation/change orders can be minimized	20.4	22
Smooth and efficient progress monitoring of the project can be done	18.4	23
Estimated duration and cost of the project can be assessed more effectively	17.4	24
Comprehensive scope and parameters can be developed	17.3	25
More realistic WBM can be developed	16.3	26
Correspondence between design and supervision team will reduced	15.3	27
Stakeholder's involvement in the project can be well identified at initial stage	14.3	28
Activities sequencing and resource estimation can be done more appropriately	14.3	29
Consultants teams will not put blame on each other	14.3	30
Build-ability/constructability in the design can be well adopted	14.3	31
Quick decision can made during execution by eliminating lengthy process	13.3	32
Contractor's claims may be reduced due to the input of both consultants team in planning and design phase	13.3	33
There may be quick response to the RFI raised by the contractor	13.3	34
Construction conflicts can be minimized	12.3	35
Practical construction schedule can be developed	12.2	36

(By appointing same design consultant as supervision consultant)	**Demerit (%)**	**Ranking**
Consultancy fee/charges can be reduced	11.2	37
Consultants become fully conversant with the project history/back ground right from initial phase of the project	10.2	38
Approval of construction methodology/material submittal/shop drawing may take less time	10.2	39
Comfortable coordination & communication between design and supervision team	8.2	40
Project execution plan can be effectively applied within the scope	8.2	41
Project scope can be managed well	6.1	42

4.6.3 Overall Ranking of Not Sure

Overall response by respondents regarding Not Sure is ranked. The question with higher frequency (percentage) is rank as 1. The frequency (percentage) of a question (By appointing same design consultant as supervision consultant, consultant-contractor interaction can be considered doubtful) is 20.4% and ranked as 1. It means that 20.4% respondents are not sure that by appointing same design consultant as supervision consultant, consultant-contractor interaction can be considered doubtful and rank it top most not sure out of 42 questions. The frequency (percentage) of a question (By appointing same design consultants as supervision consultant, consultancy fee/charges can be reduced) is 19.4% and ranked as 2. Similarly all the questions have been ranked according to their frequency (percentages) in term of not sure as shown in table 4.14.

Table 4.14: Overall ranking of not sure

(By appointing same design consultant as supervision consultant)	**Not Sure (%)**	**Ranking**
Consultant-contractor interaction can be considered doubtful	20.4	1
Consultancy fee/charges can be reduced	19.4	2
Contractor's resource compatibility with design changes may be given preference during execution	19.4	3
Possible variation/change orders can be minimized	18.4	4

(By appointing same design consultant as supervision consultant)	**Not Sure (%)**	**Ranking**
Project may become more project may become more cost efficient	18.4	5
Estimated duration and cost of the project can be assessed more effectively	17.3	6
Effective documentation of the lesson learned can be prepared	17.3	7
Self defiance of the consultant may be camouflaged	17.3	8
Risks/Hazards can be identified more efficiently	16.3	9
There may be quick response to the RFI raised by the contractor	15.3	10
Consultants undue supports to contractor may lead to Corruption	15.3	11
Realistic feasibility report can be prepared	14.3	12
Performance evaluation/vetting out of two consultants team may become difficult for client	14.3	13
Practical construction schedule can be developed	13.3	14
Contractor's claims may be reduced due to the input of both consultants team in planning and design phase	13.3	15
There can be better interpretation of the contract documents	13.3	16
There may be more realistic progress monitoring and follow up	13.3	17
Client's confidence to cancel the contract with consultant may reduce	13.3	18
Build-ability/constructability in the design can be well adopted	12.2	19
Client is not taken into loop in communication between design and supervision team on the project matters	12.2	20
Construction conflicts can be minimized	11.2	21
It is easy to obtain acceptance from the client	11.2	22
Ambiguities in the contract can be minimized	11.2	23
Possible improvement in the design can be increased	10.2	24
Final review/report of the project may be biased	10.2	25
Consultants teams will not put blame on each other	9.2	26
Correspondence between design and supervision team will reduced	9.2	27

(By appointing same design consultant as supervision consultant)	**Not Sure (%)**	**Ranking**
Smooth and efficient progress monitoring of the project can be done	9.2	28
Project scope can be managed well	8.2	29
Comprehensive scope and parameters can be developed	8.2	30
Supervision may be comparatively relaxed	8.2	31
Activities sequencing and resource estimation can be done more appropriately can be done more appropriately	8.1	32
Quick decision can made during execution by eliminating lengthy process	7.1	33
Stakeholder's involvement in the project can be well identified at initial stage	7.1	34
Approval of construction methodology/material submittal/shop drawing may take less time	6.1	35
Consultants may try to consultants may try to hide design discrepancies during execution	6.1	36
Project execution plan can be effectively applied within the scope	5.1	37
Monopoly in consultant's decision may increase	5.1	38
More realistic WBM can be developed	4.1	39
Client can be kept in dark by the consultants regarding quality/defects	4.1	40
Consultants become fully conversant with the project history/back ground right from initial phase of the project	2	41
Comfortable coordination & communication between design and supervision team	1	42

4.7 OVERALL RANKING OF MERIT, DEMERIT AND NOT SURE FOR EACH PROJECT PHASE

Overall ranking of merit, demerit, and not sure was carried out at each project phase i.e. at project initiating phase, at project planning and design phase, at project execution phase, at project monitoring and control phase, and at project closing phase. All questions of the questionnaire have been ranked at each project phase. The questions with higher frequency are ranked as 1.

4.7.1 Overall Ranking of Merit, Demerit and Not Sure at Initiating Phase

Overall ranking of merit, demerit, and not sure was carried out at initiating phase. All questions of the questionnaire have been ranked at project initiating phase. The questions with higher frequency are ranked as 1.

4.7.1.1 Overall ranking of merit at initiating phase

The response of 87.8% respondents believe that, by appointing same design consultant as supervision consultant, consultants become fully conversant with the project history/Back ground right from initial phase of the project and ranked it at top. The response of 85.7% respondents believe that, by appointing same design consultant as supervision consultant, project scope can be managed well and ranked it 2. Overall ranking of merit at project initiating phase is shown in table 4.15.

Table 4.15: Overall ranking of merit at initiating phase

(By appointing same design consultant as supervision consultant)	**Merit (%)**	**Ranking**
Consultants become fully conversant with the project history/back ground right from initial phase of the project	87.8	1
Project scope can be managed well	85.7	2
Stakeholder's involvement in the project can be well identified at initial stage	78.6	3

4.7.1.2 Overall ranking of demerit at initiating phase

Only 14.3% respondents are thinking that, by appointing same design consultant as supervision consultant, Stakeholder's involvement in the project can be well identified at initial stage is a demerits and rank it 1. Only 10.2% respondents are thinking that, by appointing same design consultant as supervision consultant, consultants become fully conversant with the project history/back ground right from initial phase of the project is a demerits and rank it 2 as shown in table 4.16.

Table 4.16: Overall ranking of demerit at initiating phase

(By appointing same design consultant as supervision consultant)	**Demerit (%)**	**Ranking**
Stakeholder's involvement in the project can be well identified at initial stage	14.3	1
Consultants become fully conversant with the project history/back ground right from initial phase of the project	10.2	2
Project scope can be managed well	6.1	3

4.7.1.3 Overall ranking of not sure at initiating phase

Only 8.2% respondents consider that they are not sure that , by appointing same design consultant as supervision consultant, Project scope can be managed well and rank it 1. Only 7.1% respondents consider that they are not sure that, by appointing same design consultant as supervision consultant, stakeholder's involvement the project can be well identified at initial stage and rank it 2 as shown in table 4.17.

Table 4.17: Overall ranking of not sure at initiating phase

(By appointing same design consultant as supervision consultant)	**Not Sure (%)**	**Ranking**
Project scope can be managed well	8.2	1
Stakeholder's involvement the project can be well identified at initial stage	7.1	2

(By appointing same design consultant as supervision consultant)	**Not Sure (%)**	**Ranking**
Consultants become fully conversant with the project history/back ground right from initial phase of the project	2	3

4.7.2 Overall Ranking of Merit, Demerit and Not Sure Planning and Design

Overall ranking of merit, demerit, and not sure was carried out at planning and phase. All questions of the questionnaire have been ranked at project planning and design phase. The questions with higher frequency are ranked as 1.

4.7.2.1 Overall ranking of merit at planning and design phase

The response of 79.6% respondents are inclined towards a question that, by appointing same design consultant as supervision consultant, more realistic WBM can be developed and rank it 1. The response of 77.6% respondents are inclined towards a question that, by appointing same design consultant as supervision consultant, activities sequencing and resource estimation can be done more appropriately and rank it 2 as shown in table 4.18.

Table 4.18: Overall ranking of merit at planning and design

(By appointing same design consultant as supervision consultant)	**Merit (%)**	**Ranking**
More realistic WBM can be developed	79.6	1
Activities sequencing and resource estimation can be done more appropriately	77.6	2
Construction conflicts can be minimized	76.5	3
Comprehensive scope and parameters can be developed	74.5	4
Practical construction schedule can be developed	74.5	5
Build-ability/constructability in the design can be well adopted	73.5	6
Possible improvement in the design can be increased	65.3	7
Estimated duration and cost of the project can be better assessed	65.3	8

(By appointing same design consultant as supervision consultant)	**Merit (%)**	**Ranking**
Ambiguities in the contract can be minimized	63.3	9
Realistic feasibility report can be prepared	59.2	10
Project may become more cost efficient	57.1	11
Risks/hazards can be identified more efficiently	56.1	12
Self defiance of the consultant may be camouflaged	30.6	13

4.7.2.2 Overall ranking of demerit at planning and design phase

The response of 52.1% respondents believe that, by appointing same design consultant as supervision consultant, self defiance of the consultant may be camouflaged and rank it 1. The response of 27.6% respondents believe that, by appointing same design consultant as supervision consultant, risks/hazards can be identified more efficiently and rank it 2 as demerit as shown in table 4.19:

Table 4.19: Overall ranking of demerit at planning and design

(By appointing same design consultant as supervision consultant)	**Demerit (%)**	**Ranking**
Self defiance of the consultant may be camouflaged	52.1	1
Risks/hazards can be identified more efficiently	27.6	2
Realistic feasibility report can be prepared	26.5	3
Ambiguities in the contract can be minimized	25.5	4
Possible improvement in the design can be increased	24.5	5
Project may become more cost efficient	24.5	6
Estimated duration and cost of the project can be assessed more effectively	17.4	7
Comprehensive scope and parameters can be developed	17.3	8
More realistic WBM can be developed	16.3	9
Activities sequencing and resource estimation can be done more appropriately	14.3	10
Build-ability/constructability in the design can be well adopted	14.3	11
Construction conflicts can be minimized	12.3	12

(By appointing same design consultant as supervision consultant)	**Demerit (%)**	**Ranking**
Practical construction schedule can be developed	12.2	13

4.7.2.3 Overall ranking of not sure at planning and design phase

Only 18.4% respondents are not sure that, by appointing same design consultant as supervision consultant, Project may become more cost efficient and rank it 1. Only 17.3% respondents are not sure that, by appointing same design consultant as supervision consultant, estimated duration and cost of the project can be assessed more effectively and rank it 2as shown in table 4.20.

Table: 4.20 Overall ranking of not sure at planning and design

(By appointing same design consultant as supervision consultant)	**Not Sure (%)**	**Ranking**
Project may become more cost efficient	18.4	1
Estimated duration and cost of the project can be assessed more effectively	17.3	2
Self defiance of the consultant may be camouflaged	17.3	3
Risks/hazards can be identified more efficiently	16.3	4
Realistic feasibility report can be prepared	14.3	5
Practical construction schedule can be developed	13.3	6
Build-ability/constructability in the design can be well adopted	12.2	7
Construction conflicts can be minimized	11.2	8
Ambiguities in the contract can be minimized	11.2	9
Possible improvement in the design can be increased	10.2	10
Comprehensive scope and parameters can be developed can be developed	8.2	11
Activities sequencing and resource estimation can be done more appropriately	8.1	12
More realistic WBM can be developed	4.1	13

4.7.3 Overall Ranking of Merit, Demerit and Not Sure at Execution Phase

Overall ranking of merit, demerit, and not sure was carried out at execution phase. All questions of the questionnaire have been ranked at project execution phase. The questions with higher frequency are ranked as 1.

4.7.3.1 Overall ranking of merit at execution phase

The response of 90.8% respondents believe that, by appointing same design consultant as supervision consultant, there will be comfortable coordination & communication between design and supervision team and rank it 1. 83.7% respondents believe that, by appointing same design consultant as supervision consultant, approval of construction methodology/material submittal/shop drawing may take less time and rank it 2 as shown in table 4.21.

Table 4.21: Overall ranking of merit at execution phase

(By appointing same design consultant as supervision consultant)	**Merits (%)**	**Ranking**
Comfortable coordination & communication between design and supervision team	90.8	1
Approval of construction methodology/material submittal/shop drawing may take less time	83.7	2
Quick decision can made during execution by eliminating lengthy process	79.6	3
Consultants teams will not put blame on each other	76.5	4
Correspondence between design and supervision team will reduced	75.5	5
Contractor's claims may be reduced due to the input of both consultants team in planning and design phase	73.4	6
There may be quick response to the RFI raised by the contractor	71.4	7
Consultancy fee/charges can be reduced	69.4	8
There can be better interpretation of the contract documents	66.3	9

(By appointing same design consultant as supervision consultant)	**Merits (%)**	**Ranking**
Possible variation/change orders can be minimized	61.2	10
Contractor's resource compatibility with design changes may be given preference during execution	58.2	11
Supervision may be comparatively relaxed	37.7	12
Client's confidence to cancel the contract with consultant may reduce	35.7	13
Consultants may try to hide design discrepancies during execution during execution	28.6	14
Client is not taken into loop in communication between design and supervision team on the project matters	27.6	15
Monopoly in consultant's decision may increase	26.5	16
Performance evaluation/vetting out of two consultants team may become difficult for client	26.5	17
Consultant-contractor interaction can be considered doubtful	26.5	18

4.7.3.2 Overall ranking of demerit at execution phase

The response of 68.4% respondents believe that, by appointing same design consultant as supervision consultant, Monopoly in consultant's decision may increase and rank it 1. 65.3% respondents believe that, by appointing same design consultant as supervision consultant, Consultants may try to hide design discrepancies during execution and rank it 2 for demerit as shown in table 4.22.

Table 4.22: Overall ranking of demerit at execution phase

(By appointing same design consultant as supervision consultant)	**Demerit (%)**	**Ranking**
Monopoly in consultant's decision may increase	68.4	1
Consultants may try to hide design discrepancies during execution	65.3	2

(By appointing same design consultant as supervision consultant)	**Demerit (%)**	**Ranking**
Client is not taken into loop in communication between design and supervision team on the project matters	60.2	3
Performance evaluation/vetting out of two consultants team may become difficult for client	59.2	4
Supervision may be comparatively relaxed	54.1	5
Consultant-contractor interaction can be considered doubtful	53.1	6
Client's confidence to cancel the contract with consultant may reduce	51	7
Contractor's resource compatibility with design changes may be given preference during execution	22.4	8
There can be better interpretation of the contract documents	20.4	9
Possible variation/change orders can be minimized	20.4	10
Correspondence between design and supervision team will reduced	15.3	11
Consultants teams will not put blame on each other	14.3	12
Quick decision can made during execution by eliminating lengthy process	13.3	13
Contractor's claims may be reduced due to the input of both consultants team in planning and design phase	13.3	14
There may be quick response to the RFI raised by the contractor	13.3	15
Consultancy fee/charges can be reduced	11.2	16
Approval of construction methodology/material submittal/shop drawing may take less time	10.2	17
Comfortable coordination & communication between design and supervision team	8.2	18

4.7.3.3 Overall ranking of not sure at execution phase

Only 20.4% respondents believe that they are not sure that , by appointing same design consultant as supervision consultant, Consultant-Contractor interaction can be considered doubtful and rank it 1. Only 19.4% respondents believe that they are not sure that, by appointing same design consultant as supervision consultant, consultancy fee/charges can be reduced and rank it 2 as shown in table 4.23.

Table 4.23: Overall ranking of not sure at execution phase

(By appointing same design consultant as supervision consultant)	**Not Sure (%)**	**Ranking**
Consultant-contractor interaction can be considered doubtful	20.4	1
Consultancy fee/charges can be reduced	19.4	2
Contractor's resource compatibility with design changes may be given preference during execution	19.4	3
Possible variation/change orders can be minimized	18.4	4
there may be quick response to the RFI raised by the contractor	15.3	5
Performance evaluation/vetting out of two consultants team may become difficult for client	14.3	6
Contractor's claims may be reduced due to the input of both consultants team in planning and design phase	13.3	7
There can be better interpretation of the contract documents	13.3	8
Client's confidence to cancel the contract with consultant may reduce	13.3	9
Client is not taken into loop in communication between design and supervision team on the project matters	12.2	10
Consultants teams will not put blame on each other	9.2	11
Correspondence between design and supervision team will reduced	9.2	12
Supervision may be comparatively relaxed	8.2	13
Quick decision can made during execution by eliminating lengthy process	7.1	14

(By appointing same design consultant as supervision consultant)	**Not Sure (%)**	**Ranking**
Approval of construction methodology/material submittal/shop drawing may take less time	6.1	15
Consultants may try to hide design discrepancies during execution	6.1	16
Monopoly in consultant's decision may increase	5.1	17
Comfortable coordination & communication between design and supervision team	1	18

4.7.4 Overall Ranking of Merit, Demerit and Not Sure at Monitoring

Overall ranking of merit, demerit, and not sure was carried out at project monitoring and control phase. All questions of the questionnaire have been ranked at monitoring and control phase. The questions with higher frequency are ranked as 1.

4.7.4.1 Overall ranking of merit at monitoring and control phase

The response of 86.7% respondents emphasizes that, by appointing same design consultant as supervision consultant, project execution plan can be effectively applied within the scope and ranks it 1. The response of 72.4% respondents believe that, by having same design consultant as supervision consultant, smooth and efficient progress monitoring of the project can be done and rank 2 as shown in table 4.24.

Table 4.24: Overall ranking of merit at monitoring and control

(By appointing same design consultant as supervision consultant)	**Merits (%)**	**Ranking**
Project execution plan can be effectively applied within the scope	86.7	1
Smooth and efficient progress monitoring of the project can be done	72.4	2
There may be more realistic progress monitoring and follow up	62.2	3
Client can be kept in dark by the consultants regarding quality/defects	28.6	4

(By appointing same design consultant as supervision consultant)	**Merits (%)**	**Ranking**
Consultants undue supports to contractor may lead to corruption	26.5	5

4.7.4.2 Overall ranking of demerit at monitoring and control phase

The response of 67.3% respondents emphasizes that, by appointing same design consultant as supervision consultant, client can be kept in dark by the consultants regarding quality/defects and ranks it 1. The response of 58.2% respondents believe that, by appointing same design consultant as supervision consultant, consultants undue supports to contractor may lead to corruption and rank it 2 as shown in table 4.25.

Table 4.25: Overall ranking of demerit at monitoring and control

(By appointing same design consultant as supervision consultant)	**Demerit (%)**	**Ranking**
Client can be kept in dark by the consultants regarding quality/defects	67.3	1
Consultants undue supports to contractor may lead to corruption	58.2	2
There may be more realistic progress monitoring and follow up	24.5	3
Smooth and efficient progress monitoring of the project can be done	18.4	4
Project execution plan can be effectively applied within the scope	8.2	5

4.7.4.3 Overall ranking of not sure at monitoring and control phase

The response of 15.3% respondents emphasizes that they are not sure that, by appointing same design consultant as supervision consultant, consultants undue supports to contractor may lead to corruption and ranks it 1. Response of the 13.3% respondents emphasizes that they are not sure that, by appointing same design consultant as supervision consultant, there may be more realistic progress monitoring and follow up and ranks it 2 as shown in table 4.26.

Table 4.26: Overall ranking of not sure at monitoring and control

(By appointing same design consultant as supervision consultant)	**Not Sure (%)**	**Ranking**
Consultants undue supports to contractor may lead to corruption	15.3	1
There may be more realistic progress monitoring and follow up	13.3	2
Smooth and efficient progress monitoring of the project can be done	9.2	3
Project execution plan can be effectively applied within the scope	5.1	4
Client can be kept in dark by the consultants regarding quality/defects	4.1	5

4.7.5 Overall Ranking of Merit, Demerit and Not Sure at Closing

Overall ranking of merit, demerit, and not sure was carried out at project closing phase. All questions of the questionnaire have been ranked at project closing phase. The questions with higher frequency are ranked as 1.

4.7.5.1 Overall ranking of merit at closing phase

The response of the 64.3% respondents considered that, by appointing same design consultant as supervision consultant, It is easy to obtain acceptance from the client and ranks it 1. Response of the 61.2% respondents considered that, by appointing same design consultant as supervision consultant, effective documentation of the lesson learned can be prepared and ranks it 2 as shown in table 4.27.

Table 4.27: Overall ranking of merit at closing phase

(By appointing same design consultant as supervision consultant)	**Merits (%)**	**Ranking**
It is easy to obtain acceptance from the client	64.3	1
Effective documentation of the lesson learned can be prepared	61.2	2
Final review/report of the project may be biased	27.6	3

4.7.5.2 Overall ranking of demerit at closing phase

The response of 62.2% respondents considered that by appointing same design consultant as supervision consultant, final review/report of the project may be biased and ranks it 1. Response of 21.5% respondents considered that by appointing same design consultant as supervision consultant, effective documentation of the lesson learned can be prepared and ranks it 2 as shown in table 4.28.

Table 4.28: Overall ranking of demerit at closing phase

(By appointing same design consultant as supervision consultant)	**Demerit (%)**	**Ranking**
Final review/report of the project may be biased	62.2	1
Effective documentation of the lesson learned can be prepared	21.5	2
It is easy to obtain acceptance from the client	24.5	3

4.7.5.3 Overall ranking of not sure at closing phase

The response of 17.3% respondents considered that they do not have any idea that, by appointing same design consultant as supervision consultant, effective documentation of the lesson learned can be prepared and ranks it 1. Response of the 11.2% respondents considered that they do not have any idea that, by appointing same design consultant as supervision consultant, it is easy to obtain Acceptance from the client and ranks it 2 as shown in table 4.29.

Table 4.29: Overall ranking of not sure at closing phase

(By appointing same design consultant as supervision consultant)	**Not Sure (%)**	**Ranking**
Effective documentation of the lesson learned can be prepared	17.3	1
It is easy to obtain acceptance from the client	11.2	2
Final review/report of the project may be biased	10.2	3

4.8 SUMMARY OF OVERALL PROJECT PHASES RANKING

Response of respondent for merit in term of frequency (percentage) at initiating phase is 84.03%, at planning and design phase 65.6%, at execution project closing phase6.4%, at monitoring and control 55.28% and at closing project closing phase1.03%.It clearly shows that respondent have ranked the initiating phase as 1 (top level) amongst the other phases, indicating that it is always better to appoint same design consultant as supervision consultant at project initiating phase as compared to other phases priority wise. Further Respondents also believe that it is always beneficial at all phase to appoint same design consultant as supervision consultant.

Response of respondent in term of frequency (percentage) at initiating phase for merit is 84.03%, demerit 10.21% and not sure 5.76% with their Ranking as 1, 5, and 5 respectively. It clearly indicate that by appointing same design consultant as supervision consultant, merits are much higher than demerit at initiating phase and similarly for other phases as shown in table 4.30 and figure 4.12.

Table 4.30: Summary of overall project phases ranking

PROJECT PHASES	Merit (%)	Ranking	Demerit (%)	Ranking	Not Sure (%)	Ranking
Initiating	84.03	1	10.21	5	5.76	5
Planning and Design	65.6	2	21.9	4	12.5	2
Execution	56.4	3	31.87	3	11.73	3
Monitoring and Control	55.28	4	35.32	2	9.4	4
Closing	51.03	5	36.07	1	12.9	1

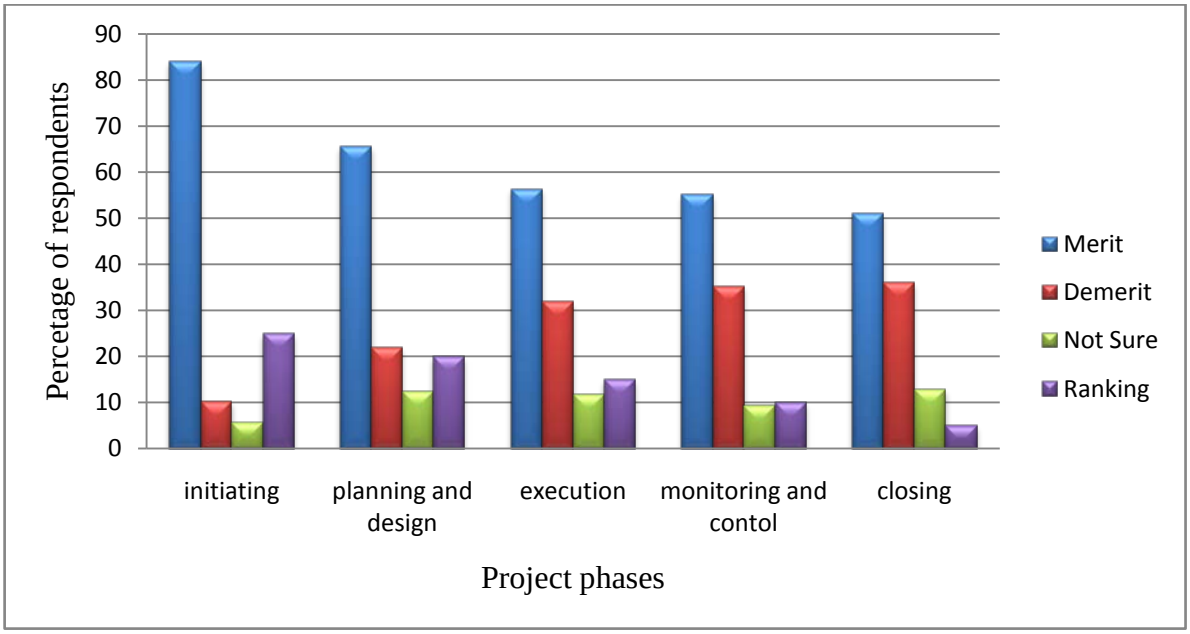

Figure 4.12: Overall project phases ranking summary

4.9 COMBINE RESPONSE OF STAKEHOLDERS

Combine response of stakeholder i.e. owner or client, consultants, contractors, and academia or researchers is carried out regarding merit, demerits, and not sure of appointing same design consultant as supervision consultant. All questions of the questionnaire have been ranked against stakeholder response. The questions with higher frequency are ranked as 1.

4.9.1 Combine Response/Ranking of Merit for Stakeholders

Combine response of all stakeholders with frequency (Percentage) of 90.82% strongly believe that, by appointing same design consultant as supervision consultants there will be comfortable coordination & communication between design and supervision team and they rank it at top. Similarly combine response of all stakeholders with Frequency (Percentage) of 87.76% strongly believe that, by appointing same design consultant as supervision consultants, consultants become fully conversant with the project history/back ground right from initial phase of the project they rank it 2. The combine response of all stakeholders till 31st ranking is more than 50% clearing indicating that merits are more than double of demerits as shown in table 4.31.

Table 4.31: Combine ranking of merit for stakeholders

(By appointing same design consultant as supervision consultant)	**Merit (%)**	**Ranking**
Comfortable coordination & communication between design and supervision team	90.82	1
Consultants become fully conversant with the project history/back ground right from initial phase of the project	87.76	2
Project execution plan can be effectively applied within the scope	86.73	3
Project scope can be managed well	85.71	4
Approval of construction methodology/material submittal/shop drawing may take less time	83.67	5
More realistic WBM can be developed	79.59	6
Quick decision can made during execution by eliminating lengthy process	79.59	7
Stakeholder's involvement the project can be well identified at initial stage	78.57	8
Activities sequencing and resource estimation can be done more appropriately	77.55	9
Construction conflicts can be minimized	76.53	10
Consultants teams will not put blame on each other	76.53	11
Correspondence between design and supervision team will reduced	75.51	12
Comprehensive scope and parameters can be developed	74.49	13
Practical construction schedule can be developed	74.49	14
Build-ability/constructability in the design can be well adopted	73.47	15
Contractor's claims may be reduced due to the input of both consultants team in planning and design phase	73.47	16
Smooth and efficient progress monitoring of the project can be done	72.45	17
There may be quick response to the RFI raised by the contractor	71.43	18
Consultancy fee/charges can be reduced	69.39	19
There can be better interpretation of the contract documents	66.33	20
Estimated duration and cost of the project can be assessed more effectively	65.31	21
Possible improvement in the design can be increased	65.31	22
It is easy to obtain acceptance from the client	64.29	23

(By appointing same design consultant as supervision consultant)	**Merit (%)**	**Ranking**
Ambiguities in the contract can be minimized	63.27	24
There may be more realistic progress monitoring and follow up	62.24	25
Possible variation/change orders can be minimized	61.22	26
Effective documentation of the lesson learned can be prepared	61.22	27
Realistic feasibility report can be prepared	59.18	28
Contractor's resource compatibility with design changes may be given preference during execution	58.16	29
Project may become more cost efficient	57.14	30
Risks/hazards can be identified more efficiently	56.12	31
Supervision may be comparatively relaxed	37.76	32
Client's confidence to cancel the contract with consultant may reduce	35.71	33
Self defiance of the consultant may be camouflaged	30.61	34
Consultants may try to hide design discrepancies during execution	28.57	35
Client can be kept in dark by the consultants regarding quality/defects	28.57	36
Client is not taken into loop in communication between design and supervision team on the project matters	27.55	37
Final review/report of the project may be biased	27.55	38
Monopoly in consultant's decision may increase	26.53	39
Performance evaluation/vetting out of two consultants team may become difficult for client	26.53	40
Consultant-contractor interaction can be considered doubtful	26.53	41
Consultants undue supports to contractor may lead to corruption	26.53	42

4.9.2 Combine Response/Ranking of Demerit for Stakeholders

Combine response of all stakeholders with frequency (Percentage) of 68.37% strongly believe that, by appointing same design consultant as supervision consultants, monopoly in consultant's decision may increase in consultant's decision and they rank it at top. The combine response of all stakeholders till 11th ranking is more than 50% clearing indicating that demerits are only 26.20% as compared to merits as shown in table 4.32.

Table 4.32: Combine ranking of demerit for stakeholders

(By appointing same design consultant as supervision consultant)	**Demerit (%)**	**Ranking**
Monopoly in consultant's decision may increase	68.37	1
Client can be kept in dark by the consultants regarding quality/defects	67.35	2
Consultants may try to hide design discrepancies during execution	65.31	3
Final review/report of the project may be biased	62.24	4
Client is not taken into loop in communication between design and supervision team on the project matters	60.20	5
Performance evaluation/vetting out of two consultants team may become difficult for client	59.18	6
Consultants undue supports to contractor may lead to corruption	58.16	7
Supervision may be comparatively relaxed	54.08	8
Consultant-contractor interaction can be considered doubtful	53.06	9
Self defiance of the consultant may be camouflaged	52.04	10
Client's confidence to cancel the contract with consultant may reduce	51.02	11
Risks/hazards can be identified more efficiently/Hazards identification	27.55	12
Realistic feasibility report can be prepared	26.53	13
Ambiguities in the contract can be minimized	25.51	14
Project may become more cost efficient	24.49	15
Possible improvement in the design can be increased	24.49	16
There may be more realistic progress monitoring and follow up	24.49	17
It is easy to obtain acceptance from the client	24.49	18
Contractor's resource compatibility with design changes may be given preference during execution	22.45	19
Effective documentation of the lesson learned can be prepared	21.43	20
There can be better interpretation of the contract documents	20.41	21
Possible variation/change orders can be minimized	20.41	22
Smooth and efficient progress monitoring of the project can be done	18.37	23
Comprehensive scope and parameters can be developed	17.35	24

(By appointing same design consultant as supervision consultant)	**Demerit (%)**	**Ranking**
Estimated duration and cost of the project can be assessed more effectively	17.35	25
More realistic WBM can be developed	16.33	26
Correspondence between design and supervision team will reduced	15.31	27
Stakeholder's involvement the project can be well identified at initial stage	14.29	28
Activities sequencing and resource estimation can be done more appropriately	14.29	29
Build-ability/constructability in the design can be well adopted	14.29	30
Consultants teams will not put blame on each other	14.29	31
Quick decision can made during execution by eliminating lengthy process	13.27	32
There may be quick response to the RFI raised by the contractor	13.27	33
Contractor's claims may be reduced due to the input of both consultants team in planning and design phase	13.27	34
Practical construction schedule can be developed	12.24	35
Construction conflicts can be minimized	12.24	36
Consultancy fee/charges can be reduced	11.22	37
Consultants become fully conversant with the project history/back ground right from initial phase of the project	10.20	38
Approval of construction methodology/material submittal/shop drawing may take less time	10.20	39
Comfortable coordination & communication between design and supervision team	8.16	40
Project execution plan can be effectively applied within the scope	8.16	41
Project scope can be managed well	6.12	42

4.9.3 Combine Response/Ranking of Not Sure for Stakeholders

Combine response of all stakeholders with frequency (Percentage) of only 20.41% are not sure that, by appointing same design consultant as supervision consultants, Consultant-Contractor interaction can be considered doubtful and they rank it 1. Only 19.39% are not sure that, by appointing same design consultant as

supervision consultants, contractor's resource compatibility with design changes may be given preference during execution and they rank it 2. The combine response of all stakeholders with ranking is shown in table 4.33.

Table 4.33: Combine ranking of not sure for stakeholders

(By appointing same design consultant as supervision consultant)	**Not Sure (%)**	**Ranking**
Consultant-contractor interaction can be considered doubtful	20.41	1
Contractor's resource compatibility with design changes may be given preference during execution	19.39	2
Consultancy fee/charges can be reduced	19.39	3
Project may become more cost efficient	18.37	4
Possible variation/change orders can be minimized	18.37	5
Estimated duration and cost of the project can be assessed more effectively	17.35	6
Self defiance of the consultant may be camouflaged	17.35	7
Effective documentation of the lesson learned can be prepared	17.35	8
Risks/hazards can be identified more efficiently/Hazards identification	16.33	9
There may be quick response to the RFI raised by the contractor	15.31	10
Consultants undue supports to contractor may lead to Corruption	15.31	11
Realistic feasibility report can be prepared	14.29	12
Performance evaluation/vetting out of two consultants team may become difficult for client	14.29	13
Practical construction schedule can be developed	13.27	14
There can be better interpretation of the contract documents	13.27	15
Contractor's claims may be reduced due to the input of both consultants team in planning and design phase	13.27	16
Client's confidence to cancel the contract with consultant may reduce	13.27	17
There may be more realistic progress monitoring and follow up	13.27	18
Build-ability/constructability in the design can be well adopted	12.24	19

(By appointing same design consultant as supervision consultant)	**Not Sure (%)**	**Ranking**
Client is not taken into loop in communication between design and supervision team on the project matters	12.24	20
Construction conflicts can be minimized	11.22	21
Ambiguities in the contract can be minimized	11.22	22
It is easy to obtain acceptance from the client	11.22	23
Possible improvement in the design can be increased	10.20	24
Final review/report of the project may be biased	10.20	25
Consultants teams will not put blame on each other	9.18	26
Correspondence between design and supervision team will reduced	9.18	27
Smooth and efficient progress monitoring of the project can be done	9.18	28
Project scope can be managed well	8.16	29
Comprehensive scope and parameters can be developed	8.16	30
Activities sequencing and resource estimation can be done more appropriately	8.16	31
Supervision may be comparatively relaxed	8.16	32
Stakeholder's involvement the project can be well identified at initial stage	7.14	33
Quick decision can made during execution by eliminating lengthy process	7.14	34
Approval of construction methodology/material submittal/shop drawing may take less time	6.12	35
Consultants may try to hide design discrepancies during execution	6.12	36
Monopoly in consultant's decision may increase	5.10	37
Project execution plan can be effectively applied within the scope	5.10	38
More realistic WBM can be developed	4.08	39
Client can be kept in dark by the consultants regarding quality/defects	4.08	40
Consultants become fully conversant with the project history/back ground right from initial phase of the project	2.04	41
Comfortable coordination & communication between design and supervision team	1.02	42

4.10 SUMMARY OF RESPONSE OF STAKEHOLDERS

Response of owner or clients for merit is 62.76%, demerit 26.70 and not sure 10.54%. Owner or client believes that there is more merit of appointment of same design consultant as supervision consultant than demerit. Response of Consultants for merit is 63.76%, demerit 27.86% and not sure 8.99%. Consultants consider that there is more merit of appointment of same design consultant as supervision consultant than demerit. Response of contractors for merit is 54.48%, demerit 30.19% and not sure 15.33%. Contactors consider that there is more merit of appointment of same design consultant as supervision consultant than demerit. Response of academia/researchers for merit is 60.95%, demerit 24.29% and not sure 14.76%. Academia/Researchers believe that there is more merit of appointment of same design consultant as supervision consultant than demerit. All stakeholders strongly consider that, by appointing same design consultant as supervision consultant merits are much more than demerit.

The perception of owner/client, consultants and academia/researchers regarding merit and demerit is almost same. The perception of contractors with other is little bit different but contractors are still inclined toward merit than demerit as shown in table 4.34 and figure 4.13.

Table 4.34: **Summary of response of stakeholders**

Firm Type	**Summary of Response of Firm Type**		
	Merit (%)	**Demerit (%)**	**Not Sure (%)**
Owner/Client	62.76	26.70	10.54
Consultants	63.15	27.86	8.99
Contractor	54.48	30.19	15.33
Academia/Researcher	60.95	24.29	14.76
Total	60.71	27.94	11.35

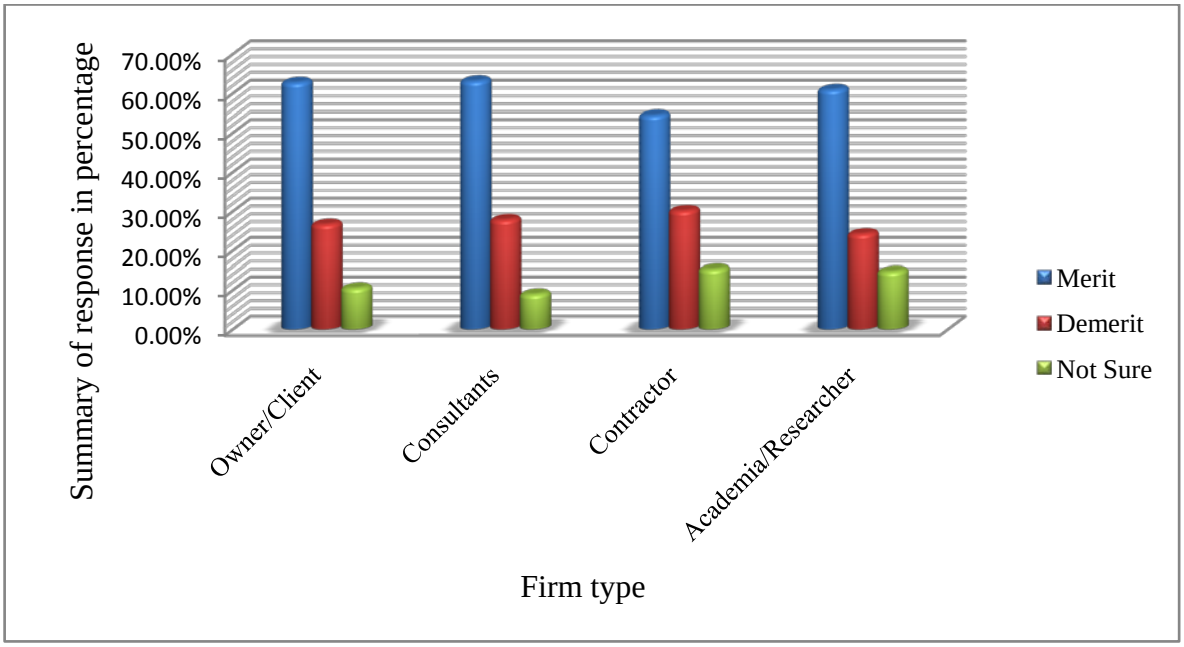

Figure 4.13: Summary of response of stakeholders

4.11 RATIO OF MERIT/ DEMERIT FOR STAKEHOLDERS

Ratio of merit/demerit for client is 2.35, consultants 2.27, contractor 1.80, and academia/researcher is 2.51. It clearly indicates that all stakeholders consider that, by appointing same design consultants as supervision consultants, merits are more than double of demerits. For contractors merits are almost double than demerit. All stakeholders have almost same perception regarding the study as shown in table 4.35 and figure 4.14.

Table: 4.35 Ratio of response of stakeholders

Firm Types	Merit /Demerit
Owner/Client	2.35
Consultants	2.27
Contractor	1.80
Academia/Researcher	2.51
Overall	2.17

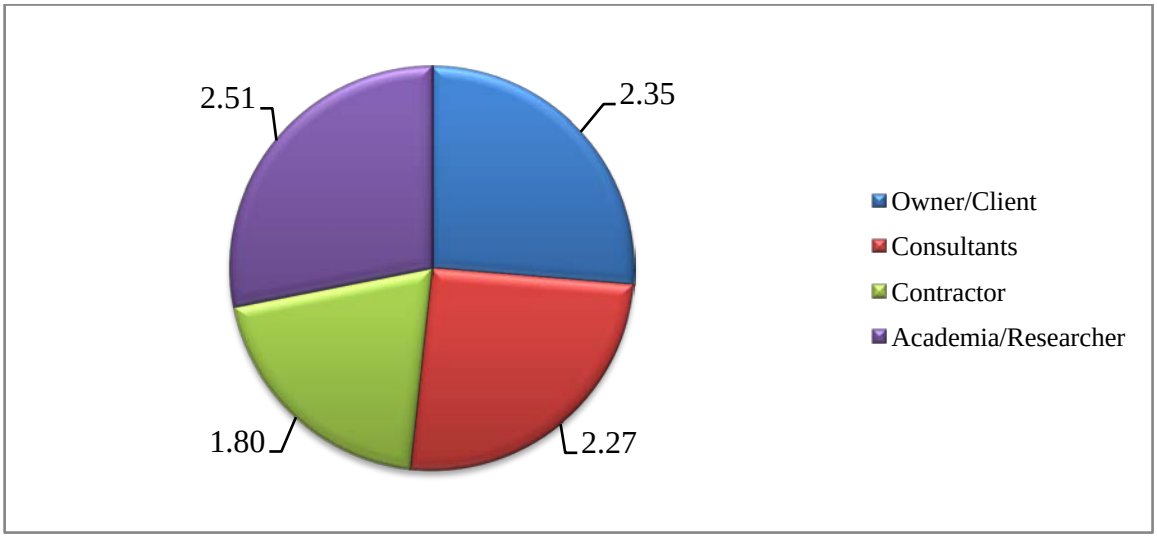

Figure 4.14: Ratio of response of stakeholders

4.12 PROJECT PHASE WISE RESPONSE OF STAKEHOLDERS

Response of stakeholders is carried out at each project phase. The project phases are initiating phase, planning and design phase, execution phase, monitoring and control phase, and project closing phase.

4.12.1 Project Phase Wise Response of Owner/Client

Owner/client response to project initiating phase is, merit 82.14%, demerit 13.10% and not sure 4.76%.Their response to project planning and design phase is merit 66.21%, demerit 21.15% and not sure 12.64% and similarly for other phases. It is very clear that for each phase owner/client consider that it is favorable to appoint same design consultant as supervision consultant as shown in table 4.36.

Table 4.36: Project phase wise response of owner/client

Project Phases	Merit (%)	Demerit (%)	Not Sure (%)
Project initiating Phase	82.14	13.10	4.76
Project Planning and design phase	66.21	21.15	12.64
Project execution phase	59.13	29.76	11.11
Project monitoring and control phase	57.86	33.57	8.57
Project closing phase	58.33	34.52	7.14

4.12.2 Project Phase Wise Response of Consultants

Consultant's response to project initiating phase is, merit 88.33%, demerit 8.33% and not sure 3.33%. Their response to project planning and design phase is, merit 68.85%, demerit 21.54 % and not sure 9.62% and similarly for other phases. It is very clear that for each phase consultants consider, that it is always better to appoint same design consultants as supervision consultant as shown in table 4.37.

Table 4.37: Project phase wise response of consultants

Project Phases	Merit (%)	Demerit (%)	Not Sure (%)
Project initiating phase	88.33	8.33	3.33
Project Planning and design phase	68.85	21.54	9.62
Project execution phase	58.61	32.22	9.17
Project monitoring and control phase	56.50	36.50	7.00
Project closing phase	51.67	34.17	14.17

4.12.3 Project Phase Wise Response of Contractors

Contactors response to project initiating phase is, merit 77.33%, demerit 12.00% and not sure 10.67%.Their response to project planning and design phase is, merit 59.69%, demerit 24.92% and not sure 15.38% and similarly for other phases . It is very clear that for each phase contractors consider that it is better to appoint same design consultants as supervision consultant excluding project closing phase as shown in table 4.38.

Table 4.38: Project phase wise response of contractors

Project Phases	Merit (%)	Demerit (%)	Not Sure (%)
Project initiating phase	77.33	12.00	10.67
Project Planning and design phase	59.69	24.92	15.38
Project execution phase	50.00	33.56	16.44
Project monitoring and control phase	50.40	36.80	12.80
Project closing phase	42.67	40.00	17.33

4.12.4 Project Phase Wise Response of Academia/Researchers

Academia/Researchers response to project initiating phase is, merit 93.33%, demerit 0% and not sure 6.67%.Their response to project planning and design phase is, merit 66.15%, demerit 13.85% and not sure 20% and similarly for other phases .It is very clear that, for each phase academia/researchers consider that it is better to appoint same design consultants as supervision consultant excluding at project closing phase as shown in table 4.39.

Table 4.39: Project phase wise response of academia/researchers

Project Phases	Merit (%)	Demerit (%)	Not Sure (%)
Project initiating phase	93.33	0.00	6.67
Project Planning and design phase	66.15	13.85	20.00
Project execution phase	55.56	32.22	12.22
Project monitoring and control phase	56.00	28.00	16.00
Project closing phase	46.67	40.00	13.33

4.13 RANKING OF PROJECT PHASES BY OWNER/CLIENT

Ranking of project phases is carried out against merit, demerit, and not sure. All questions of the questionnaire have been ranked by owner or client. The questions with higher frequency are ranked as 1.

4.13.1 Ranking of Phases by Owner/Client for Merit

Owner or client response for merit at project initiating phase is 82.14% and ranks it 1 in merit as compared to other phases. Owner or client response for merit at project planning and design phase is 66.21% and ranks it 2 in merit. Owner or client response for merit at project execution phase is 59.13% and ranks it 3 in merit. Owner/clients believe that it is better to appoint same design consultant as supervision consultant for all phases as shown in table 4.40.

Table 4.40: Ranking of phases by owner/client for merit

Project Phases	Merit (%)	Ranking
Project initiating phase	82.14	1
Project Planning and design phase	66.21	2
Project execution phase	59.13	3
Project closing phase	58.33	4
Project monitoring and control phase	57.86	5

4.13.2 Ranking of Phases by Owner/Client for Demerit

Owner/clients responses for demerit at Project closing phase are 34.52 % and rank it 2 in demerit as compared to other phases. Owner/clients responses for demerit at project monitoring and control phase are 33.57 % and rank it 2 in demerit. Similarly the response for other phases is shown in table 4.41.

Table 4.41: Ranking of phases by owner/client for demerit

Project Phases	Demerit (%)	Ranking
Project closing phase	34.52	1
Project monitoring and control phase	33.57	2
Project execution phase	29.76	3
Project Planning and design phase	21.15	4
Project initiating phase	13.10	5

4.13.3 Ranking of Phases by Owner/Client for Not Sure

The response of 12.64% owner or clients thinks that, they are not sure that, whether it is merit or demerit of appointing same design consultant as supervision consultant at project planning and design phase and rank it 1 in not sure as compared to other phases. The response of 11.11% owner or clients thinks that they are not sure that, whether it is merit or demerit of appointing same design consultant as supervision consultant at project execution phase and rank it 2 in not sure. Similarly the response for other phases is shown in table 4.42.

Table 4.42: Ranking of phases by owner/client for not sure

Project Phases	Not Sure (%)	Ranking
Project Planning and design phase	12.64	1
Project execution phase	11.11	2
Project monitoring and control phase	8.57	3
Project closing phase	7.14	4
Project initiating phase	4.76	5

4.14 RANKING OF PROJECT PHASES BY CONSULTANTS

Ranking of project phases is carried out against merit, demerit, and not sure. All questions of the questionnaire have been ranked by consultants. The questions with higher frequency are ranked as 1.

4.14.1 Ranking of Phases by Consultants for Merit

Consultant's responses for merit at project initiating phase are 88.33% and rank it 1 in merit as compared to other phases. Consultant's responses for merit at project Planning and design phase are 68.85% and rank it 2 in merit. Consultants believe that it is better to appoint same design consultant as supervision consultant for all phases as shown in table 4.43.

Table 4.43: Ranking of phases by consultants for merit

Project Phases	Merit (%)	Ranking
Project initiating phase	88.33	1
Project Planning and design phase	68.85	2
Project execution phase	58.61	3
Project monitoring and control phase	56.50	4
Project closing phase	51.67	5

4.14.2 Ranking of Phases by Consultants for Demerit

Consultant's responses for demerit at project monitoring and control phase are 36.50% and rank it 1 in demerit as compared to other phases. Consultant's responses for

demerit at project closing phase are 34.17% and rank it 2 in demerit. Responses for other phases are shown in table 4.44.

Table 4.44: Ranking of phases by consultants for demerit

Project Phases	Demerit (%)	Ranking
Project monitoring and control phase	36.50	1
Project closing phase	34.17	2
Project execution phase	32.22	3
Project Planning and design phase	21.54	4
Project initiating phase	8.33	5

4.14.3 Ranking of Phases by Consultants for Not Sure

The response of 14.17% consultants thinks that they are not sure that, whether it is merit or demerit of appointing same design consultant as supervision consultant at project closing phase and rank it 1 in not sure as compared to other phases. Only 9.62% consultants thinks that they are not sure that, whether it is merit or demerit of appointing same design consultant as supervision consultant at project planning and design phase and rank it 2 in not sure. Similarly the response for other phases is shown in table 4.45.

Table 4.45: Ranking of phases by consultants for not sure

Project Phases	Not Sure (%)	Ranking
Project closing phase	14.17	1
Project Planning and design phase	9.62	2
Project execution phase	9.17	3
Project monitoring and control phase	7.00	4
Project initiating phase	3.33	5

4.15 RANKING OF PROJECT PHASES BY CONTRACTORS

Ranking of project phases is carried out against merit, demerit, and not sure. All questions of the questionnaire have been ranked by contractors. The questions with higher frequency are ranked as 1.

4.15.1 Ranking of Phases by Contractors for Merit

Contractor's responses for merit at project initiating phase are 77.33% and rank it 1 in merit as compared to other phases. Contractor's responses for merit at project Planning and design phase are 59.69% and rank it 2 in merit. Contractors believe that it is better to appoint same design consultant as supervision consultant for all phases excluding at project closing phase as shown in table 4.46.

Table 4.46: Ranking of phases by contractors for merit

Project Phases	Merit (%)	Ranking
Project initiating phase	77.33	1
Project Planning and design phase	59.69	2
Project monitoring and control phase	50.40	3
Project execution phase	50.00	4
Project closing phase	42.67	5

4.15.2 Ranking of Phases by Contractors for Demerit

Contractor's responses for demerit at Project closing phase are 40.00% and rank it 1 in demerit as compared to other phases. Contractor's responses for demerit at project monitoring and control phase are 40.00% and rank it 2 in demerit. Responses for other phases are shown in table 4.47.

Table 4.47: Ranking of phases by contractors for demerit

Project Phases	Demerit (%)	Ranking
Project closing phase	40.00	1
Project monitoring and control phase	36.80	2
Project execution phase	33.56	3
Project Planning and design phase	24.92	4
Project initiating phase	12.00	5

4.15.3 Ranking of Phases by Contractors for Not Sure

The response of 17.33% contractors thinks that they are not sure that, whether it is merit or demerit of appointing same design consultant as supervision consultant at Project closing phase and rank it 1 in not sure as compared to other phases. Only 16.44% contractors thinks that they are not sure that, whether it is merit or demerit of appointing same design consultant as supervision consultant at project execution phase and rank it 2 in not sure. Similarly the response for other phases is shown in table 4.48.

Table 4.48: Ranking of phases by contractors for not sure

Project Phases	Not Sure (%)	Ranking
Project closing phase	17.33	1
Project execution phase	16.44	2
Project Planning and design phase	15.38	3
Project monitoring and control phase	12.80	4
Project initiating phase	10.67	5

4.16 RANKING OF PROJECT PHASES BY ACADEMIA

Ranking of project phases is carried out against merit, demerit, and not sure. All questions of the questionnaire have been ranked by academia or researchers. The questions with higher frequency are ranked as 1.

4.16.1 Ranking of Phases by Academia/Researcher for Merit

Academia/researchers responses for merit at project initiating phase are 93.33% and rank it 1 in merit as compared to other phases. Academia/Researchers responses for merit at project planning and design phase are 66.15% and rank it 2 in merit. Academia/Researchers responses for merit at project monitoring and control phase are 56% and rank it 3 in merit. Academia/Researchers believe that it is better to appoint same design consultant as supervision consultant for all phases excluding at project closing phase as shown in table 4.49.

Table 4.49: Ranking of phases by academia/researcher for merit

Project Phases	Merit (%)	Ranking
Project initiating phase	93.33	1
Project Planning and design phase	66.15	2
Project monitoring and control phase	56.00	3
Project execution phase	55.56	4
Project closing phase	46.67	5

4.16.2 Ranking of Phases by Academia/Researcher for Demerit

Academia/Researchers responses for demerit at Project closing phase are 40.00% and rank it 1 in demerit as compared to other phases. Academia/Researchers responses for demerit at Project execution phase are 32.22% and rank it 2 in demerit Responses for other phases are shown in table 4.50.

Table 4.50: Ranking of phases by academia/researcher for demerit

Project Phases	Demerit (%)	Ranking
Project closing phase	40.00	1
Project execution phase	32.22	2
Project monitoring and control phase	28.00	3
Project Planning and design phase	13.85	4
Project initiating phase	0.00	5

4.16.3 Ranking of Phases by Academia/Researcher for Not Sure

The response of 20% academia/researchers thinks that they are not sure that, whether it is merit or demerit of appointing same design consultant as supervision consultant at project planning and design phase and rank it 1 in not sure as compared to other phases. Only 16% academia/researchers thinks that they are not sure that, whether it is merit or demerit of appointing same design consultant as supervision consultant at project monitoring and control phase and rank it 2 in not sure. Similarly the response for other phases is shown in table 4.51.

Table 4.51: Ranking of phases by academia/researcher for not sure

Project Phases	Not Sure (%)	Ranking
Project Planning and design phase	20.00	1
Project monitoring and control phase	16.00	2
Project closing phase	13.33	3
Project execution phase	12.22	4
Project initiating phase	6.67	5

4.17 TOP THREE MERITS, DEMERIT AND NOT SURE OF STAKEHOLDERS

Top three merits, demerits, and not sure are carried out in term of frequency for stakeholders i.e. owners or clients, consultants, contractors, and academia or researchers. The responses with maximum frequency is the top most merit or demerit or not sure.

4.17.1 Owner/Client Top Three Merits, Demerit and Not Sure

Top three merits, demerits, and not sure are carried out in term of frequency for owners or clients. The responses with maximum frequency is the top first merit or demerit or not sure.

4.17.1.1 Owner/client top 3 merits

Owner or client with responses of 89.29% consider that, by appointing same design consultant as supervision consultants, there will be comfortable coordination & communication between design and supervision team and project execution plan can be effectively applied within the scope and rank it top first merit. Owner or client with responses of 85.71% consider that, by appointing same design consultant as supervision consultants, project scope can be managed well, consultants become fully conversant with the project history/back ground right from initial phase of the project and consultants teams will not put blame on each other. Owner or client ranks theses three statement as top second merits. Similarly the top third merits are shown in table 4.52.

Table 4.52: Top 3 merits of owner/client

(By appointing same design consultant as supervision consultant)	**Merit (%)**
Comfortable coordination & communication between design and supervision team	89.29
Project execution plan can be effectively applied within the scope	89.29
Project scope can be managed well	85.71
Consultants become fully conversant with the project history/back ground right from initial phase of the project	85.71
Consultants teams will not put blame on each other	85.71
Practical construction schedule can be developed	82.14
Approval of construction methodology/material submittal/shop drawing may take less time	82.14
There may be quick response to the RFI raised by the contractor	82.14
Contractor's claims may be reduced due to the input of both consultants team in planning and design phase	82.14
Smooth and efficient progress monitoring of the project can be done	82.14

4.17.1.2 Owner/client top 3 demerits

Owner or client with responses of 21.43% consider that, it is demerit that, by appointing same design consultant as supervision consultants, There can be better interpretation of the contract documents and it is easy to obtain acceptance from the client . Owner or client ranks theses two statement as top first demerit. Similarly the top second and third demerits are shown in table 4.53.

Table 4.53: Top 3 demerits of owner/client

(By appointing same design consultant as supervision consultant)	**Demerit (%)**
There can be better interpretation of the contract documents	21.43
It is easy to obtain acceptance from the client	21.43
Stakeholder’s involvement the project can be well identified at initial stage	14.29

(By appointing same design consultant as supervision consultant)	**Demerit (%)**
Consultants become fully conversant with the project history/back ground right from initial phase of the project	14.29
Comprehensive scope and parameters can be developed	14.29
Build-ability/constructability in the design can be well adopted	14.29
Approval of construction methodology/material submittal/shop drawing may take less time	14.29
Quick decision can made during execution by eliminating lengthy process	14.29
Contractor's claims may be reduced due to the input of both consultants team in planning and design phase	14.29
Smooth and efficient progress monitoring of the project can be done	14.29
Practical construction schedule can be developed	7.14
There may be quick response to the RFI raised by the contractor	7.14
Consultants teams will not put blame on each other	7.14

4.17.1.3 Owner/client top 3 not sure

The response of 28.57% owner/clients thinks that they are not sure that, whether it is merit or demerit, by appointing same design consultant as supervision consultant Consultant-contractor interaction can be considered doubtful and rank it at top first not sure. Similarly the top second and third not sure are shown in table 4.54.

Table 4.54: Top 3 not sure of owner/client

(By appointing same design consultant as supervision consultant)	**Not Sure (%)**
Consultant-contractor interaction can be considered doubtful	28.57
Self defiance of the consultant may be camouflaged	25.00
Consultancy fee/charges can be reduced	21.43
Consultants undue supports to contractor may lead to corruption	21.43

4.17.2 Consultants Top Three Merits, Demerit and Not Sure

Top three merits, demerits, and not sure are carried out in term of frequency for consultants. The responses with maximum frequency is the top first merit or demerit or not sure.

4.17.2.1 Consultants top 3 merits

Consultants with responses of 92.5% consider that, by appointing same design consultant as supervision consultants, consultants become fully conversant with the project history/back ground right from initial phase of the project. Consultants rank this statement as top first merit. Similarly the top second and third merits are shown in table 4.55.

Table 4.55: Top 3 merits of consultants

(By appointing same design consultant as supervision consultant)	**Merit (%)**
Consultants become fully conversant with the project history/back ground right from initial phase of the project	92.5
Project scope can be managed well	90
Comfortable coordination & communication between design and supervision team	90
Quick decision can made during execution by eliminating lengthy process	87.5

4.17.2.2 Consultants top 3 demerits

Consultants with responses of 70% consider that, by appointing same design consultant as supervision consultants, consultants may try to hide design discrepancies during execution, Monopoly in consultant's decision may increase and client can be kept in dark by the consultants regarding quality. These three statements are rank as top first demerit. Similarly the top second and third demerits are shown in table 4.56.

Table 4.56: Top 3 demerits of consultants

(By appointing same design consultant as supervision consultant)	**Demerit (%)**
Consultants may try to hide design discrepancies during execution	70
Monopoly in consultant's decision may	70
Client can be kept in dark by the consultants regarding quality/defects	70
Final review/report of the project may be biased	65
Client is not taken into loop in communication between design and supervision team on the project matters	60
Performance evaluation/vetting out of two consultants team may become difficult for client	60
Consultants undue supports to contractor may lead to corruption	60

4.17.2.3 Consultants top 3 not sure

The response of 22.5% consultants thinks that they are not sure that, whether it is merit or demerit that, by appointing same design consultant as supervision consultant, possible variation/change orders can be minimized and effective documentation of the lesson learned and rank it at top first not sure. Similarly the top second and third not sure are shown in table 4.57.

Table 4.57: Top 3 not sure of consultants

(By appointing same design consultant as supervision consultant)	**Not Sure (%)**
Possible variation/change orders can be minimized	22.5
Effective documentation of the lesson learned	22.5
Contractor's resource compatibility with design changes may be given preference during execution	20
There may be quick response to the RFI raised by the contractor	15

4.17.3 Contactors Top Three Merits, Demerit and Not Sure

Top three merits, demerits, and not sure are carried out in term of frequency for contractors. The responses with maximum frequency is the top first merit or demerit or not sure.

4.17.3.1 Contactors top 3 merits

Contactors with responses of 92% consider that, by appointing same design consultant as supervision consultants, there will be comfortable coordination & communication between design and supervision team. Contactors rank this statement as top first merit. Similarly the top second and third merits are shown in table 4.58.

Table 4.58: Top 3 merits of contractors

(By appointing same design consultant as supervision consultant)	**Merit (%)**
Comfortable coordination & communication between design and supervision team	92
Effective application of project plan	88
Project scope can be managed well	80
Consultants become fully conversant with the project history/back ground right from initial phase of the project	80
Build-ability/constructability in the design can be well adopted	80
Approval of construction methodology/material submittal/shop drawing may take less time	80

4.17.3.2 Contactors top 3 demerits

Contactors with responses of 72% consider that, by appointing same design consultant as supervision consultants, supervision may be comparatively relaxed. Contactors rank this statement as top first demerit. Similarly the top second and third demerits are shown in table 4.59.

Table 4.59: Top 3 demerits of contractors

(By appointing same design consultant as supervision consultant)	**Demerit (%)**
Supervision may be comparatively relaxed	72
Performance evaluation/vetting out of two consultants team may become difficult for client	64
Client can be kept in dark by the consultants regarding quality/defects	64
Self defiance of the consultant may be camouflaged	60
Consultants may try to hide design discrepancies during execution	60
Monopoly in consultant's decision may increase	60
Consultants undue supports to contractor may lead to corruption	60
Final review/report of the project may be biased	60

4.17.3.3 Contractors top 3 not sure

The response of 32% contactors thinks that they are not sure that, whether it is merit or demerit that, by appointing same design consultant as supervision consultant, project may become more cost efficient and rank it at top first not sure. Similarly the top second and third not sure are shown in table 4.60.

Table 4.60: Top 3 not sure of contactors

(By appointing same design consultant as supervision consultant)	**Not Sure (%)**
Project may become more cost efficient	32
Risks/hazards can be identified more efficiently	28
Contractor's claims may be reduced due to the input of both consultants team in planning and design phase	28
Contractor's resource compatibility with design changes may be given preference during execution	28
Consultancy fee/charges can be reduced	28
Client's confidence to cancel the contract with consultant may reduce	28
Estimated duration and cost of the project can be assessed more effectively	24

(By appointing same design consultant as supervision consultant)	**Not Sure (%)**
Practical construction schedule can be developed	24
Possible variation/change orders can be minimized	24
Performance evaluation/vetting out of two consultants team may become difficult for client	24
Consultant-contractor interaction can be considered doubtful	24
There may be more realistic progress monitoring and follow up	24

4.17.4 Academia/Researcher Top Three Merits, Demerit and Not Sure

Top three merits, demerits, and not sure are carried out in term of frequency for academia or researchers. The responses with maximum frequency is the top first merit or demerit or not sure.

4.17.4.1 Academia/researcher top 3 merits

Academia/researcher with responses of 100% considers that, by appointing same design consultant as supervision consultants, stakeholder's involvement the project can be well identified at initial stage, consultants become fully conversant with the project history/back ground right from initial phase of the project, more realistic WBM can be developed, there will be comfortable coordination & communication between design and supervision team, approval of construction methodology/material submittal/shop drawing may take less time, quick decision can made during execution by eliminating lengthy process, possible variation/change orders can be minimized, correspondence between design and supervision team will reduced and project execution plan can be effectively applied within the scope. Academia/researcher ranks these statements as top first merit. Similarly the top second and third merits are shown in table 4.61.

Table 4.61: Top 3 merits of academia/researcher

(By appointing same design consultant as supervision consultant)	**Merit (%)**
Stakeholder's involvement the project can be well identified at initial stage	100
Consultants become fully conversant with the project history/back ground right from initial phase of the project	100
More realistic WBM can be developed	100
Comfortable coordination & communication between design and supervision team	100
Approval of construction methodology/material submittal/shop drawing may take less time	100
Quick decision can made during execution by eliminating lengthy process	100
Possible variation/change orders can be minimized	100
Correspondence between design and supervision team will reduced	100
Project execution plan can be effectively applied within the scope	100
Project scope can be managed well	80
Comprehensive scope and parameters can be developed	80
Activities sequencing and resource estimation can be done more appropriately	80
Practical construction schedule can be developed	80
Construction conflicts can be minimized	80
Ambiguities in the contract can be minimized	80
Project may become more cost efficient	80
There may be quick response to the RFI raised by the contractor	80
Contractor's claims may be reduced due to the input of both consultants team in planning and design phase	80
Contractor's resource compatibility with design changes may be given preference during execution	80
Smooth and efficient progress monitoring of the project can be done	80
It is easy to obtain acceptance from the client	80
Realistic feasibility report can be prepared	60

(By appointing same design consultant as supervision consultant)	**Merit (%)**
Risks/hazards can be identified more efficiently	60
Build-ability/constructability in the design can be well adopted	60
Possible improvement in the design can be increased	60
Consultants teams will not put blame on each other	60
Consultancy fee/charges can be reduced	60
Supervision may be comparatively relaxed	60
There may be more realistic progress monitoring and follow up	60
Effective documentation of the lesson learned can be prepared	60

4.17.4.2 Academia/researcher top 3 demerits

Academia/researcher with responses of 100% consider that, by appointing same design consultant as supervision consultants, consultants may try to hide design discrepancies during execution, monopoly in consultant's decision may increase , final review/report of the project may be biased . Academia/researcher ranks these statements as top first demerit. Similarly the top second and third demerits are shown in table 4.62.

Table 4.62: Top 3 demerits of academia/researcher

(By appointing same design consultant as supervision consultant)	**Demerit (%)**
Consultants may try to hide design discrepancies during execution	100
Monopoly in consultant's decision may increase	100
Final review/report of the project may be biased	100
Client is not taken into loop in communication between design and supervision team on the project matters	80
Client's confidence to cancel the contract with consultant may reduce	80
Performance evaluation/vetting out of two consultants team may become difficult for client	80
Client can be kept in dark by the consultants regarding quality/defects	80
Self defiance of the consultant may be camouflaged	60
Consultant-contractor interaction can be considered doubtful	60
Consultants undue supports to contractor may lead to corruption	60

4.17.4.3 Academia/researcher top 3 not sure

The response of 60% academia/researcher thinks that they are not sure that, whether it is merit or demerit that, by appointing same design consultant as supervision consultant, estimated duration and cost of the project can be assessed more effectively and there can be better interpretation of the contract documents and rank it at top first not sure. Similarly the top second and third not sure are shown in table 4.63.

Table 4.63: Top 3 not sure of academia/researcher

(By appointing same design consultant as supervision consultant)	**Not Sure (%)**
Estimated duration and cost of the project can be assessed more effectively	60
There can be better interpretation of the contract documents	60
Possible improvement in the design can be increased	40
Consultants teams will not put blame on each other	40
There may be more realistic progress monitoring and follow up	40
Project scope can be managed well	20
Comprehensive scope and parameters can be developed	20
Realistic feasibility report can be prepared	20
Activities sequencing and resource estimation can be done more appropriately	20
Risks/hazards can be identified more efficiently	20
Build-ability/constructability in the design can be well adopted	20
Construction conflicts can be minimized	20
Project may become more cost efficient	20
Self defiance of the consultant may be camouflaged	20
There may be quick response to the RFI raised by the contractor	20
Contractor’s resource compatibility with design changes may be given preference during execution	20
Consultancy fee/charges can be reduced	20

(By appointing same design consultant as supervision consultant)	**Not Sure (%)**
Client is not taken into loop in communication between design and supervision team on the project matters	20
Performance evaluation/vetting out of two consultants team may become difficult for client	20
Consultant-contractor interaction can be considered doubtful	20
Smooth and efficient progress monitoring of the project can be done	20
Consultants undue supports to contractor may lead to corruption	20
It is easy to obtain acceptance from the client	20
Effective documentation of the lesson learned can be prepared	20

4.18 SUMMARY

In this chapter data analysis of 98 valid questionnaires was carried out by using MS Excel and SPSS-19. Data was collected from engineers and architects who used to work with different firms registered with Pakistan Engineering Council.

Descriptive statistics which include frequency distribution, Percentages, Ratio, mode, pie charts and bar charts are used to achieve the objective of this study. Both merits and demerits of appointing the same design consultant as supervision consultant were investigated. The results of research show that stakeholders (owner or client, consultants, contractors and researchers) strongly support appointing the same design consultant as supervision consultant. The results indicated that the merits are more than double to that of demerits of appointing the same design consultant as supervision consultant in the construction industry in Pakistan. Stakeholders consider that it is quite appropriate to have same design consultant as supervision consultant at all project phases. Design and supervision services are to be simultaneously provided by one consulting firm. Results further indicate that it is not appropriate to employ different professionals on a project for these two services when close coordination is generally required for the successful completion of the same. Perception of all stakeholders is carried out and concluded that all have same perception.

All stakeholders believe that there are following ***top five Merits*** of appointment of same design consultant as supervision consultant in the construction industry in Pakistan.

1. There will be comfortable coordination & communication between Design and Supervision team
2. Consultants become fully conversant with the project history/Back ground right from initial phase of the project
3. Project execution plan can be effectively applied within the scope
4. Project scope can be managed well
5. Approval of construction methodology/Material submittal/Shop drawing may take less time

All stakeholders believe that there are following ***top five Demerits*** of appointment of same design consultant as supervision consultant in the construction industry in Pakistan.

1. Monopoly in consultant's decision may increase in consultant's decision
2. Client can be kept in dark by the consultants regarding quality/defects
3. Consultants may try to hide design discrepancies during execution
4. Final review/report of the project may be biased
5. Client is not taken into loop in communication between design and supervision team on the project matters

Similarly top 3 merits and demerits are worked out for all Stakeholders (Owner/client, consultants, contractors and academia/researchers) independently. Project phases ranking was done for each stakeholder. All the stakeholders rank the Project initiating phase at top.

Chapter 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

In this Chapter, conclusions and recommendations are presented. The conclusions have been made on the basis of results obtained in Chapter 4. The analysis was done for study of merits and demerits of appointing same design consultant as supervision consultant in construction industry in Pakistan.

5.2 REVIEW OF OBJECTIVES

The research objectives are as follows:-

a) To define a consultant, identify types, study the difference between the design and the supervision consultant in construction industry in Pakistan;

b) To study the appointment/procurement of consultancy services in the industry;

c) Evaluate merits and demerits of appointing same design consultant as supervision consultant in the construction industry;

d) Analyze the collected data and draw conclusion and recommendation for the benefit of the industry;

The first and second objective has been accomplished through extensive literature review. Third and fourth objective has been achieved through questionnaire survey .The data received back from respondents is analyzed by using MS Excel and SPSS-19.

5.3 CONCLUSIONS

After extensive literature review and analysis of data by using MS Excel & SPSS-19, following conclusions are drawn from this study.

a. The most preferred method for selection of consultants is quality and cost based method, as this method ensures maximum economy and efficiency and allow for flexibility in weighing quality and cost.

b. Results indicate that, all stakeholders (owner or client, consultants, contractors and researchers) strongly support appointing the same design consultant as supervision consultant.
c. Results indicated that, the merits are more than double to that of demerits of appointing the same design consultant as supervision consultant in the construction industry in Pakistan.
d. Stakeholders consider that it is quite appropriate to have same design consultant as supervision consultant at all project phases.
e. All stakeholders emphasize that by appointing same design consultant as supervision consultant, merits are more at project initiating phase as compared to other phases.
f. Design and supervision services are to be simultaneously provided by one consulting firm.
g. Results indicated the eighty nine percent respondents are well conversant with the involvements of design and supervision consultant in the projects.
h. Results indicates that all stakeholders support that by appointing same design consultant as supervision consultant, the strongest merit will be the comfortable coordination and communication between design and supervision team and rank it at top.
i. Results indicate that all stakeholders support that by appointing same design consultant as supervision consultant, the strongest demerit is increase in monopoly of consultants in their decisions rank it at top.
j. By appointing same design consultant as supervision consultant, the perception of owner or client, consultants and academia/researchers regarding merit and demerit is almost same. The perception of contractors with others is little bit different but contractors are still inclined toward merit as compared to demerit.
k. Results indicates that by appointing the same design consultant as supervision consultant critical disadvantages are, monopoly in consultant’s decision may increase, client can be kept in dark by the consultants regarding defects, consultants may try to hide design

discrepancies during execution, performance evaluation/vetting out of two consultants team may become difficult for client.

l. Finally results indicate that, it is not appropriate to employ different professionals on a project for these two services when close coordination is generally required for the successful completion of the project.

5.4 RECOMMENDATIONS

It is recommended that, the owner or client should appoint same design consultant as supervision consultant in the construction industry in Pakistan.

5.5 RECOMMENDATIONS FOR FUTURE RESEARCH

It is recommended that, case studies can be documented where design and supervision is provided by one company and vice versa.

5.6 RECOMMENDATIONS FOR EDUCATION

a. This study is very useful to the students who are interested in learning about consultants.
b. Professional experts may be invited in seminars as guest speaker to share their working experience with students.

5.7 SUMMARY

In this chapter, conclusions and recommendations have been presented. Conclusions have been made in the light of results of analysis that was carried out in chapter 4. The results indicate that by appointing same design consultant as supervision consultant merits are more than double to that of demerits. Results require that design and supervision services need to be simultaneously provided by one consulting firm. Results indicate that, it is not appropriate to employ different professionals for these two services when there is close coordination are required for the successful completion of projects.

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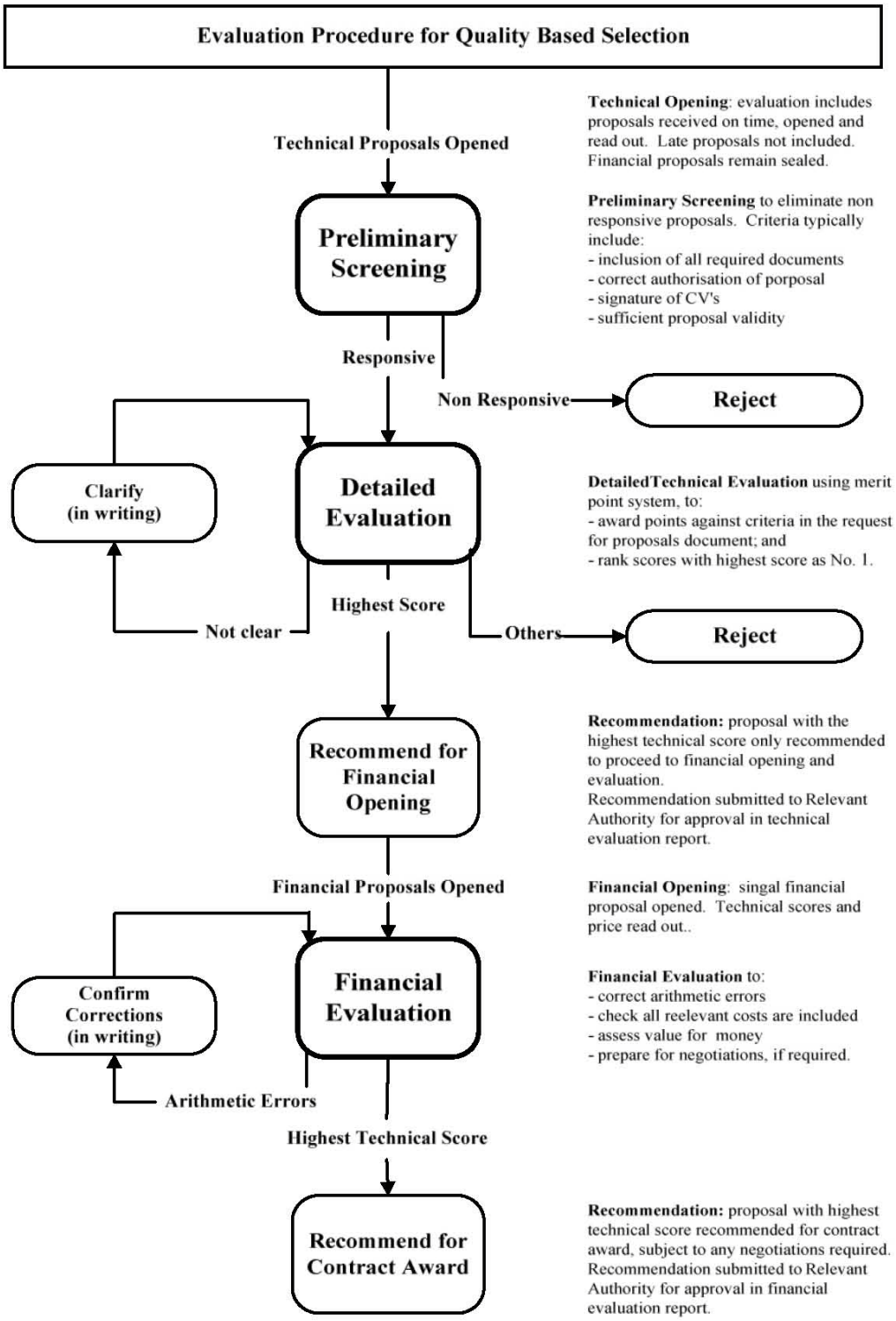
APPENDICES

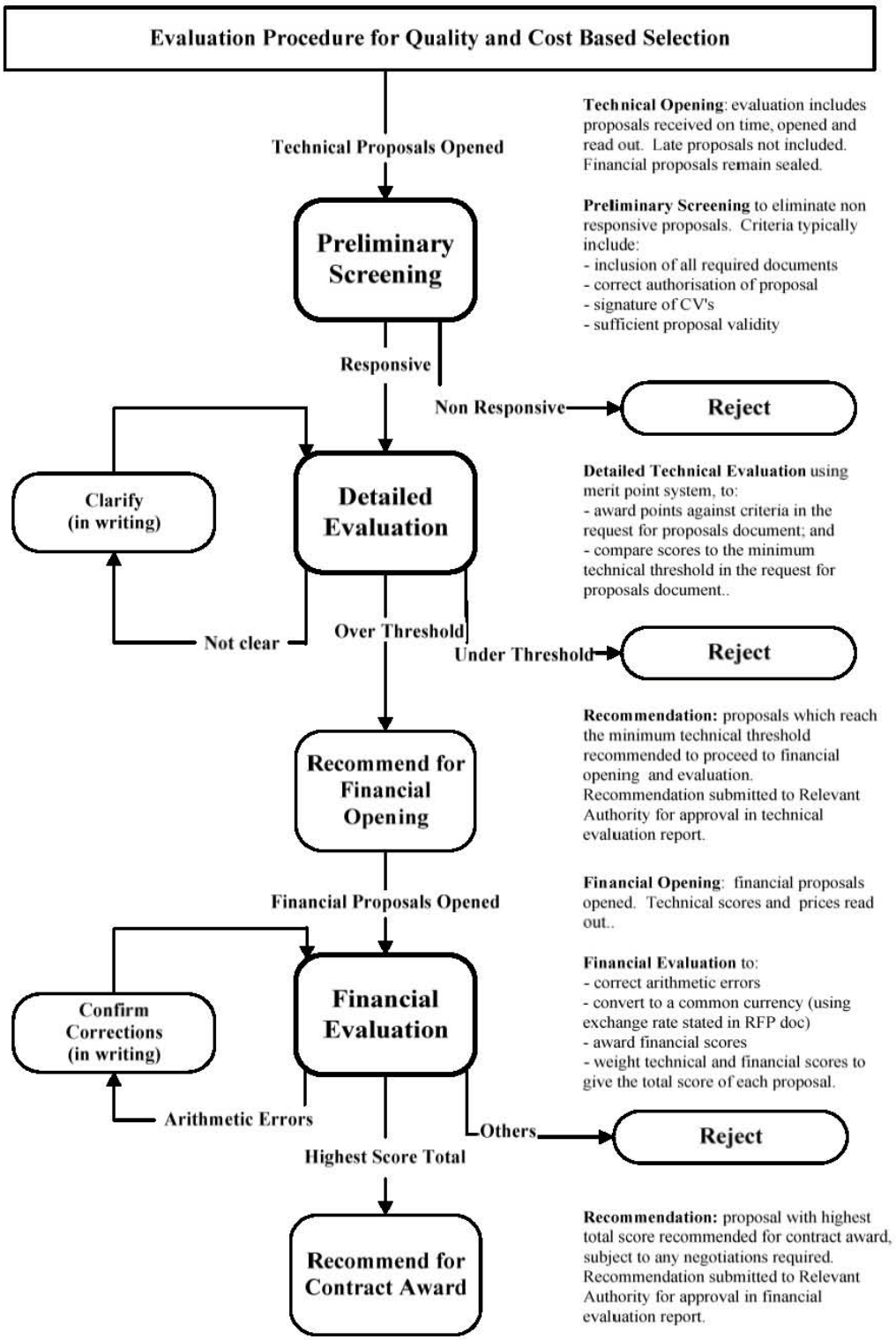
APPENDIX-I: Checklist for preparation of TOR

Assignment Reference No.		20_ _	
Assignment Long Title			
Assignment Short Title			
		Yes	No
1.	Background information		
2.	Aims and Objectives clearly defined and understandable		
3.	Scope of Work sufficiently explains tasks to be done		
4.	Consultancy and Expertise specifically mentioned		
5.	Methodology for implementing TOR described		
6.	Type of consultancy: individual or firm clearly mentioned		
7.	Duration in person-months is shown		
8.	Responsibilities of consultant(s) shown separately		
9.	Outputs and Deliverables are clear and well defined		
10.	Reports required during assignment life specified		
11.	Procurement selection method used		
12.	If QCBS: evaluation criteria for Technical Proposals included		
13.	Implementation arrangements described		
14.	Logistics & support facilities Client is providing listed and described		
15.	Recruitment schedule of consultants provided		
16.	Cost of consultant's services calculated and shown		
17.	Cost of out-of-pocket expenditure and provisional sums provided		
18.	Payment Schedule with payments linked to delivery outputs shown		
Checklist prepared by		Date:	
Checklist approved by		Date:	

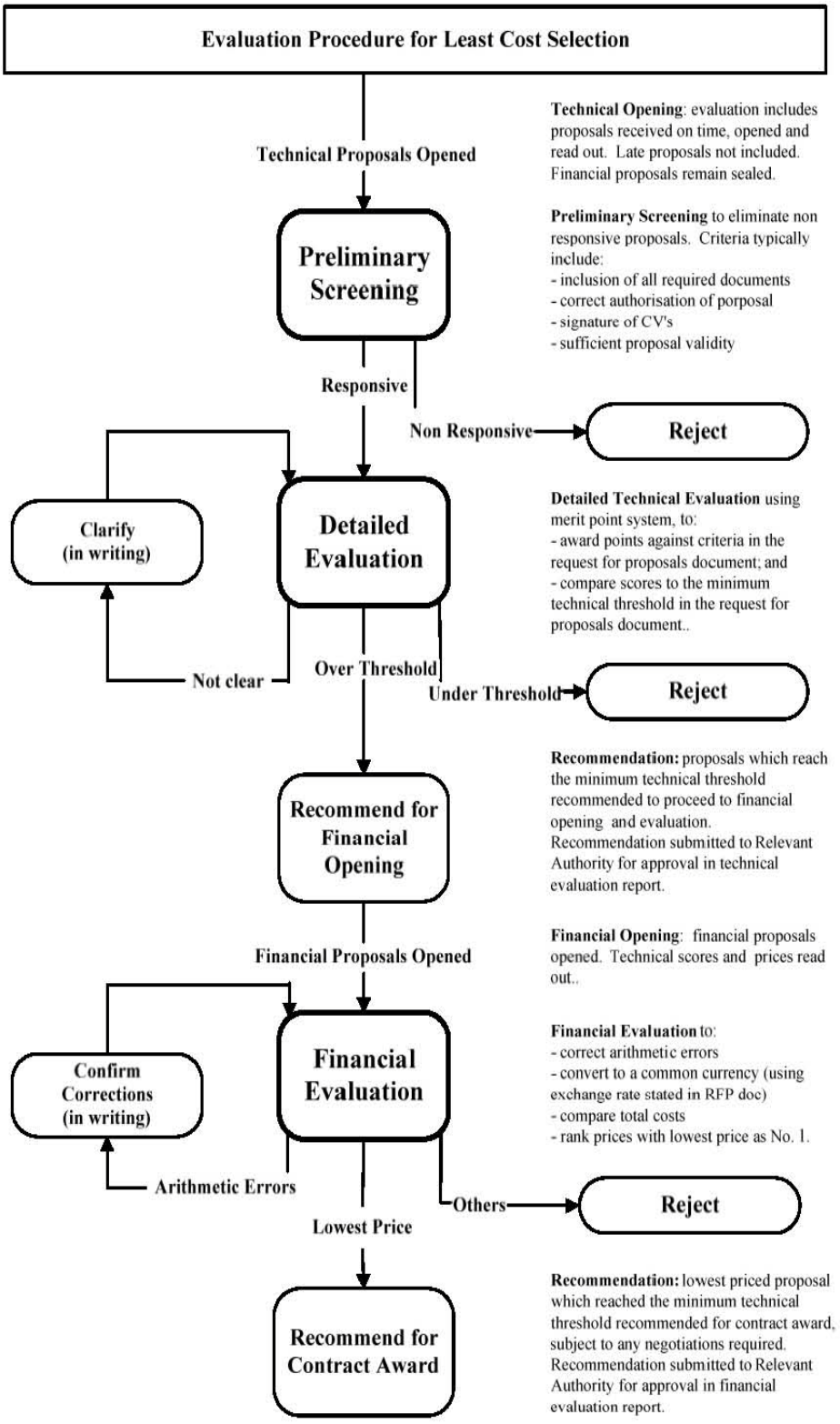
APPENDIX-II: Evaluation procedure for QBS



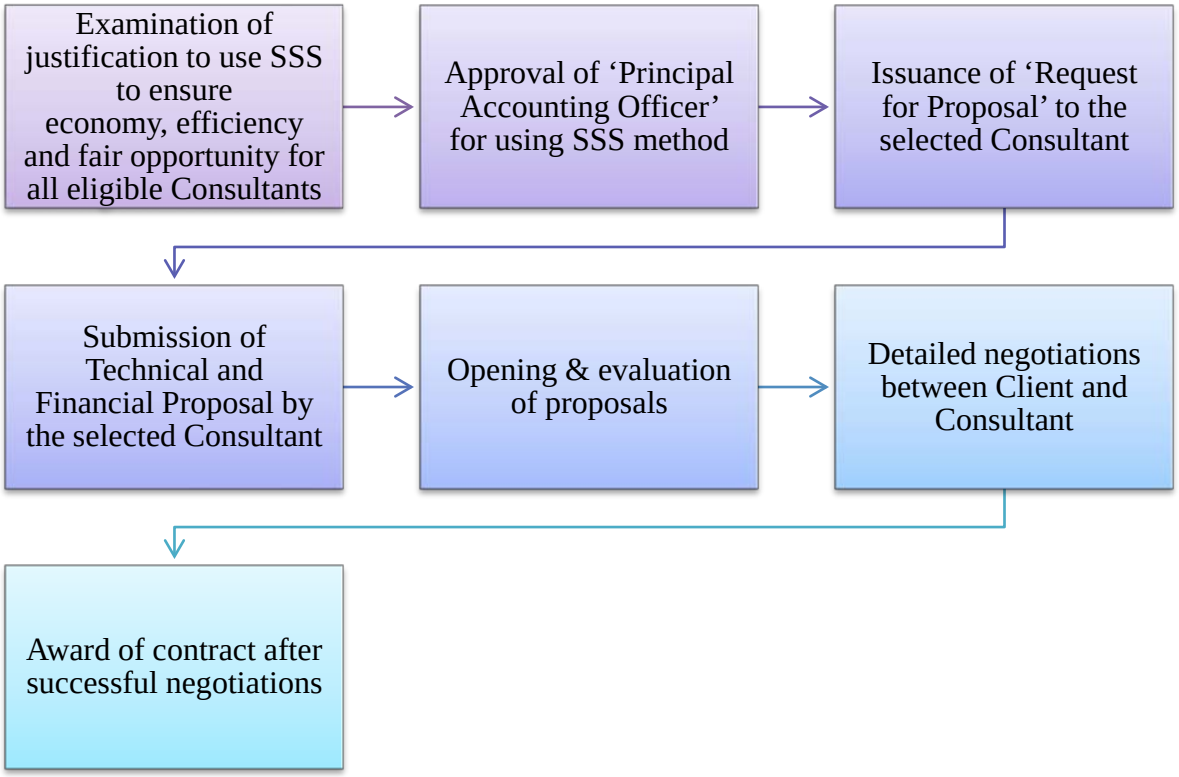
APPENDIX-III: Evaluation procedure for QCBS



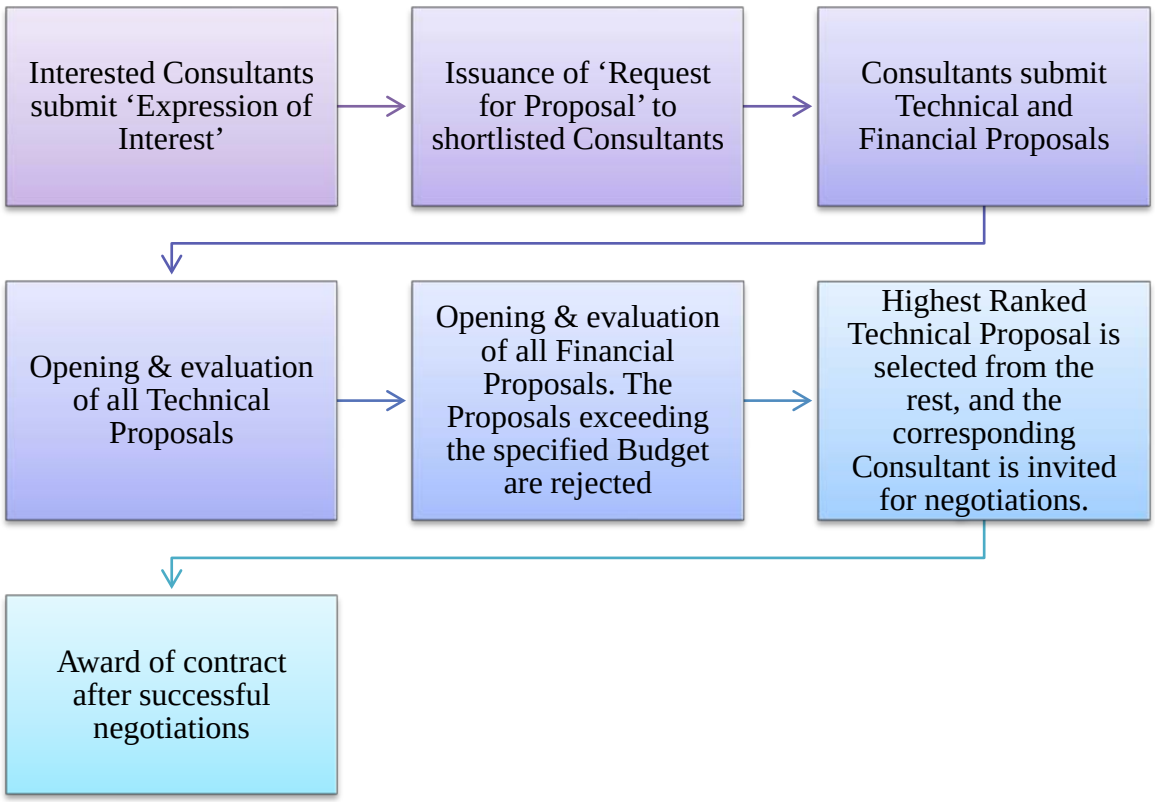
APPENDIX-IV: Evaluation procedure for LCS



APPENDIX-V: Single source selection



APPENDIX-VI: Fixed Budget Selection



APPENDIX-VII: Criteria for short listing of consultants

#	Criteria	Name of firm: Score	Up to	Remarks
1	Experience in similar projects • level of responsibility, not just number of projects; • as a principal or an associate to a lead consulting firm? • experience of the firm or individuals before they joined the firm?		10	
2	Experience with similar project authorities • (national, provincial, district, municipal level; • integrated or specialised agencies, small or large scale projects?		10	
3	Experience in climatic, geographical and cultural areas similar to those of the project		10	
4	Work experience in the kind of service(s) under consideration		30	
5	Work volume in monetary value over the last 3-5 years		10	
6	(Number and) qualification of permanent and associated staff		25	
7	Presentation and language of profile		5	
	Total		100	

i. Highest score: firm which had in numerous (at least 5) similar projects the lead and a long track record as a firm

ii. Highest score: firm which has worked in previous occasions (at least 5) with similar project authorities in large scale projects and integrated in the hierarchical structure

iii. Highest score: firm which has worked at least in 3 previous occasions in similar climatic, geographical and cultural areas

iv. Highest score: firm which has offered in at least 3 previous occasions similar services/expertise

v. Highest score: firm with increasing work volume over the last 3-5 years

vi. Highest score: firm with numerous (relative to the size of the firm) staff with highest qualifications (considering the institution where qualifications have been acquired)

vii. Highest score: a profile tailor-made for the task, free or nearly free of typing mistakes, with uniform formatting and free or nearly free of grammatical and orthographical errors.

Name of Evaluator _____

Date and Signature of Evaluator: _____

APPENDIX-VIII: Criteria for contract awarding to consultant

#	Criteria	Name of firm: Score	Up to	Remarks
	Qualification			
1	Experience in similar projects • level of responsibility, not just number of projects; • as a principal or an associate to a lead consulting firm? • experience of the firm or individuals before they joined the firm?		10	
2	Experience in climatic, geographical and cultural areas similar to those of the project		10	
3	Experience with similar project authorities • (national, provincial, district, municipal level; integrated • or specialised agencies, small or large scale projects?)		10	
4	Work experience in the kind of service(s) under consideration (i.e. surveys, research, gender issues, poverty, marginalised groups, etc.)		15	
	Approach and Methodology			
5	Understanding of objectives		8	
	Quality of Methodology		8	
	Innovativeness or comments on ToR		8	
	Work plan and staffing schedule		6	
	Proposal presentation		5	
	Personnel			
	Nominated International Experts		10	
6	1			
	2			
	3			
	Nominated National Experts		10	
	1			
	2			
	3			
	Total		100	

Technical Quality = 80 % / Cost = 20 % *(this ratio may be changed on case to case basis)*

The formula for the determining the score of the financial score is: Sf = 1,000 x Fm / F , Sf - is the financial score / Fm is the lowest priced proposal / F is the price of the proposal being considered

I. Highest score: firm which had in numerous (at least 5) similar projects the lead and a long track record as a firm
II. Highest score: firm which has worked at least in 3 previous occasions in similar climatic, geographical and cultural areas
III. Highest score: firm which has worked in previous occasions (at least 5) with similar project authorities in large scale projects and integrated in the hierarchical structure
Iv. Highest score: firm which has offered in at least 3 previous occasions similar services/expertise
v. Highest score: See sub-criteria to be considered
vi. Highest score: qualifications and experience of consultants proposed (TL and key members get more weight; reputation of institution where qualifications have been acquired should be considered); In case no International Experts are involved more weight can be given to the individual National consultants

Name of Evaluator:	Date and Signature of Evaluator:

APPENDIX-IX: QUESTIONNAIRE

Research survey for study of Merits and Demerits of appointing same design consultant as Supervision consultant in the construction industry in Pakistan

Respondent profile :(All details are for academic purposes and will be kept confidential)

1. Name of respondent: _____
2. Email address: _____Contact No._____
3. Name of Firm/Organization/Company:_____

4. Please indicate your Gender
   - ☐ Male
   - ☐ Female

5. Please indicate your qualification (*Tick one box only*)
   - ☐ Doctorate (PhD)
   - ☐ Master Degree (MS/M Phil)
   - ☐ Bachelor Degree
   - ☐ Diploma Holder
   - ☐ Other (pls. specify)_____

6. You belong to which stakeholder company/ Organization (*Tick one box only*)
   - ☐ Owner/ Client
   - ☐ Consultant
   - ☐ Contractor
   - ☐ Sub-Contractor
   - ☐ Academia/Researcher
   - ☐ Other (pls. specify)_____

7. Your company/ Organization belong to which sector (*Tick one box only*)
   - ☐ Govt.
   - ☐ Private
   - ☐ University/College
   - ☐ Other(pls. specify)_____

8. Please indicate your position in company/ Organization (*Tick one box only*)
   - ☐ Managing Director
   - ☐ Project Director / Manager
   - ☐ Deputy Project Director/ Manager
   - ☐ Project Engineer / Architect / Planner
   - ☐ Construction Manager
   - ☐ Site Supervisor
   - ☐ Professor / Lecturer
   - ☐ Other(pls. specify)_____

9. Please indicate your professional experience (in years) (*Tick one box only*)

0-5	6-10	11-15	16-20	>20
☐	☐	☐	☐	☐

10. In which type of construction do you
    - ☐ Buildings
    - ☐ Infrastructure and Road

involve? (*Tick as many boxes as apply*)

- ☐ Bridges/ Flyovers
- ☐ Runways
- ☐ Dams/ hydal power / Canals
- ☐ Other(pls. specify)_____

11. Please indicate worth of your project (in Million). (*Tick one box only*)
    - ☐ < 100
    - ☐ 100-500
    - ☐ > 500
12. Please indicate the average number of employees in your company/ organization. (*Tick one box only*)
    - ☐ < 50
    - ☐ 50-100
    - ☐ 100-500
    - ☐ >500
13. Do your company/ organization have any international certification for quality? (*Tick one box only*)
    - ☐ Yes
    - ☐ No

Merits and Demerits of appointing same design consultant as Supervision consultant in the construction industry in Pakistan

AT PROJECT INITIATING PHASE.

	Merit	Demerit	Not sure
1. By appointing same design consultant as supervision consultant, Project scope can be managed well. (*Tick one box only*)	☐	☐	☐
2. By appointing same design consultant as supervision consultant, Stakeholder's involvement in the project can be well identified at initial stage. (*Tick one box only*)	☐	☐	☐
3. By appointing same design consultant as supervision consultant, both consultants become fully conversant with the project history/background right from initial phase of the project. (*Tick one box only*)	☐	☐	☐

AT PROJECT PLANNING AND DESIGN PHASE

	Merit	Demerit	Not sure
4. By appointing same design consultant as supervision consultant, Comprehensive Project scope and parameters can be established. (*Tick one box only*)	☐	☐	☐

	Merit	Demerit	Not sure
5. By appointing same design consultant as supervision consultant, Realistic feasibility report can be prepared. (*Tick one box only*)	□	□	□
6. By appointing same design consultant as supervision consultant, More realistic execution stages (WORK BREAKDOWN STRUCTURE) can be developed. (*Tick one box only*)	□	□	□
7. By appointing same design consultant as supervision consultant, Execution stages sequencing and resource estimation can be done more appropriately.(*Tick one box only*)	□	□	□
8. By appointing same design consultant as supervision consultant, Estimated duration and cost of the project can be assessed more effectively .(*Tick one box only*)	□	□	□
9. By appointing same design consultant as supervision consultant, Practical construction schedule of the project can be developed in a better way. (*Tick one box only*)	□	□	□
10. By appointing same design consultant as supervision consultant, Risks/Hazards can be identified more efficiently. (*Tick one box only*)	□	□	□
11. By appointing same design consultant as supervision consultant, Build-ability/ constructability in design can be well adopted. (*Tick one box only*)	□	□	□
12. By appointing same design consultant as supervision consultant, Construction conflicts can be minimized. (*Tick one box only*)	□	□	□
13. By appointing same design consultant as supervision consultant, Ambiguities in the contract documents can be minimized. (*Tick one box only*)	□	□	□
14. By appointing same design consultant as supervision consultant, Project may become more cost efficient. (*Tick one box only*)	□	□	□
15. By appointing same design consultant as supervision consultant, Possible improvement in design may increase. (*Tick one box only*)	□	□	□
16. By appointing same design consultant as supervision consultant, Self-defiance of consultants may be camouflaged. (*Tick one box only*)	□	□	□

AT PROJECT EXECUTION PHASE

17. By appointing same design consultant as supervision consultant, There can be Better interpretation of the contract documents. (*Tick one box only*)	Merit □	Demerit □	Not sure □
18. By appointing same design consultant as supervision consultant, There will be comfortable coordination and communication between design and supervision team.(*Tick one box only*)	Merit □	Demerit □	Not sure □
19. By appointing same design consultant as supervision consultant, Approval of construction methodology/material submittal/shop drawings may take less time. (*Tick one box only*)	Merit □	Demerit □	Not sure □
20. By appointing same design consultant as supervision consultant, Quick decision can be made during execution by eliminating the lengthy process.(*Tick one box only*)	Merit □	Demerit □	Not sure □
21. By appointing same design consultant as supervision consultant, There may be quick response to the Request For Information(RFI) raised by the contractor.(*Tick one box only*)	Merit □	Demerit □	Not sure □
22. By appointing same design consultant as supervision consultant, Possible variation/ Change orders can be minimized. (*Tick one box only*)	Merit □	Demerit □	Not sure □
23. By appointing same design consultant as supervision consultant, Contractor's claims may be reduced due to the input of both consultants in planning and design phase. (*Tick one box only*)	Merit □	Demerit □	Not sure □
24. By appointing same design consultant as supervision consultant, Consultants will not put blames on each other. (*Tick one box only*)	Merit □	Demerit □	Not sure □
25. By appointing same design consultant as supervision consultant, Contractor's resources compatibility with design changes may be given preference during execution.(*Tick one box only*)	Merit □	Demerit □	Not sure □
26. By appointing same design consultant as supervision consultant, Correspondence/ Paper work between design and supervision consultant will reduce.(*Tick one box only*)	Merit □	Demerit □	Not sure □
27. By appointing same design consultant as supervision consultant, Consultancy Fee/Charges of consultants will be reduced. (*Tick one box only*)	Merit □	Demerit □	Not sure □
28. By appointing same design consultant as supervision consultant, Supervision may be comparatively relaxed. (*Tick one box only*)	Merit □	Demerit □	Not sure □

	Merit	Demerit	Not sure
29. By appointing same design consultant as supervision consultant, both consultants may try to hide the design discrepancies during execution. (*Tick one box only*)	□	□	□
30. By appointing same design consultant as supervision consultant, Client is not taken into loop in communication between design and supervision team on project matters. (*Tick one box only*)	□	□	□
31. By appointing same design consultant as supervision consultant, Monopoly in consultant's decision may increase.(*Tick one box only*)	□	□	□
32. By appointing same design consultant as supervision consultant, Client's confidence to cancel the contract with consultants may reduce. (*Tick one box only*)	□	□	□
33. By appointing same design consultant as supervision consultant, Performance Evaluation/ vetting out of the two consultants may become difficult for Client. (*Tick one box only*)	□	□	□
34. By appointing same design consultant as supervision consultant, From Client's perspective, Consultants-Contractor interaction can be considered doubtful. (*Tick one box only*)	□	□	□

AT PROJECT MONITORING AND CONTROL PHASE

	Merit	Demerit	Not sure
35. By appointing same design consultant as supervision consultant, Project execution plans can be effectively applied within the scope.(*Tick one box only*)	□	□	□
36. By appointing same design consultant as supervision consultant, Smooth and efficient progress monitoring of the project can be done. (*Tick one box only*)	□	□	□
37. By appointing same design consultant as supervision consultant, there may be more realistic progress reporting and follow up. (*Tick one box only*	□	□	□
38. By appointing same design consultant as supervision consultant, Client can be kept in dark by the consultants regarding quality/ defects.(*Tick one box only*)	□	□	□
39. By appointing same design consultant as supervision consultant, Consultants undue support to the contractor may lead to corruption.(*Tick one box only*)	□	□	□

AT PROJECT CLOSING PHASE

	Merit	Demerit	Not sure
40. By appointing same design consultant as supervision consultant, it may be easy to obtain Acceptance from the client. (*Tick one box only*)	□	□	□
41. By appointing same design consultant as supervision consultant,	Merit	Demerit	Not sure

Effective Documentation of lessons learned can be prepared.
(*Tick one box only*)

	Merit	Demerit	Not sure
	☐	☐	☐

42. By appointing same design consultant as supervision consultant, Final review/report of the project may be biased.
(*Tick one box only*)

	Merit	Demerit	Not sure
	☐	☐	☐

Please write Merits or Demerits other than mentioned above. (Optional)

Merits_____

_____

_____

_____

Demerits_____

_____

_____

Thanks a lot for your cooperation.