Evaluation of Consultant Performance

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Abstract: The evaluation of the consultant's performance is crucial to the success of a consulting assignment especially when today's construction projects are becoming more sophisticated, large-scale, and risky. The objective of this paper to identify the main criteria used to evaluate the engineering consultant performance in Saudi Arabia's construction process.

1. INTRODUCTION

The consulting engineer plays an important role in the Arabian Gulf and world economies, consulting engineering services and responsibilities are poorly understood.

The evaluation of the consultant's performance is crucial to the success of a consulting assignment especially when today's construction projects are becoming more sophisticated, large-scale, and risky. However, since individual clients have developed their own consultant's performance evaluation (CPE) procedures, the sharing of performance information, though desirable, may not be too meaningful as the results of evaluation could be inconsistent (Thomas and Lai-Kit, 2004).

A consulting engineer is an independent, professional engineer who performs professional engineering services for clients on a fee basis (Maxwell, 1982). On the other hand, performance measurement is a debatable subject. Different industries have different performance measurement systems and even within the same industry there could be many types of performance measurement systems, Some clients stress cost performance, some stress schedule or quality performance while others look for a combination of two or more performance measures.

Statement of the Problem

Poor engineering consultant performance is a major cause of construction process inefficiency, leading directly to delays, rework and variations, and contributing to increases in project time and cost, for both owner and contractors alike.

There are many evaluation criteria which might be taken into consideration while evaluating the performance level of the engineering consultant. Among these criteria are:

- Quality of feasibility study report.
- Quality of design.
- Accuracy of cost estimate.
- Administration of contract.
- Supervision of contractor.
- Project schedule control.

Research Objectives

The objectives of this research are:

1. To identify the main criteria used to evaluate the engineering consultant performance in Saudi Arabia's construction process.
2. To determine the weight importance of each criteria on the engineering consultant performance evaluation.
3. To provide recommendations for improvement of the overall engineering consultant performance in Saudi Arabia's construction industry, using the result of the evaluation survey and available evaluation forms used worldwide.

Significance of the Study

Every project owner is concerned about design and execution of his project. To achieve the end results of having the project done with the least cost, the shortest time, and the best quality. Under full control by the project consultant, the project owner should be aware of the project consultant's performance. Consultant performance should be monitored by both parties, the owner and the consultant, to ensure the quality of the project.

The research will show what criteria might be taken into consideration while the process of the consultant performance evaluation and the weight importance of each criterion.

Scope and Limitations

1. The contractor selected will be large construction contractors (Grade 1, 2 or 3) as classified by the Ministry of Municipalities and Rural Affairs (MOMRA).
2. The consultants selected will be reputable and have past experience of more than 10 years in the construction field.
3. All building projects built only in the Eastern province of Saudi Arabia.
4. Building construction projects of 10 million Saudi Riyals or more.

2. LITRATURE REVIEW

DEFENITION OF ENGINEERING CONSULTANT

Generally a consulting engineer is defined as a professional who mainly has two mixed capabilities of practical professional experience and those of a business person who is applying his knowledge in rendering the professional services to the clients in return for money *(Al-Basher, 1998)*.

DUTIES AND RESPONSIBILITIES OF THE CONSULTANT

Duties and responsibilities of E/C include, but are not limited to, providing professional architectural or engineering expertise in the assigned program area; performing prior studies; performing the most complex and advanced architectural or engineering work; maintaining continual, high-level contacts with public and private officials; project management; defining drawings and design calculations required for works; making independent decisions on a continual basis; and managing project budgets and approving the disbursement of funds *(Ofori, 2001)*.

A good design: *(Garret, 1985)*

- Meets the basic owner's requirements
- Is functional, aesthetically pleasing.
- Is cost effective to acquire, own and operate.
- Is well coordinated and readily biddable."

- The client's duties were outlined by one study. The client should fulfill these duties himself as mandatory requirements for project success. The client must:
- Make basic firm decisions during the initial briefing period.
- Make every effort to understand what he is being told and what his initial decisions mean.
- Realize that the pre-costing of building is not an exact science.
- Be closely involved during design stage and make further decisions as design develop.
- Approve the cost plan at the end of design stage with a full understanding of what he is approving (Pszenicki, 1980).

The AIA manual of professional practice outlined the following duties of the client that shall help the consultant reach a successful solution to the client's needs:

The owner should:

- Clearly state his requirements
- Furnish the A/E with full legal, utility, and physical information about the building site.
- Enter with the A/E into a formal detailed agreement stating all conditions relating to the project.
- Give full attention and consideration to documents prepared and presented by the consultant.

Clients have the right to question the consultant's ability to meet their needs in the total sense, and to get the best possible value for their money in terms of cost, quality and time. The consultant duties are to help the client in achieving his targets(AL-Musallami, 1992).

The question is: Does the consultant work to the quality expected? Does he really care about protecting the client's interest in the widest sense of the word, including proper site investigations, optimal design, good supervision, avoidance of less attractive alterations, proper decisions, and good relations with the contractor? (Pszenicki, 1980)

SERVICES OFFERED BY ENGINEERING CONSULTANT FIRMS

Services offered by E/C firms include *(ADB Guidelines, 1998*):

Pre investment studies

- Studies to establish investment priorities and sectored policies.
- To assess government operations and institutions for project formulation and implementation.
- To determine feasibility and justification of investment projects.

Detailed engineering and design:

- Preparation of detailed design.
- Specifications.
- Cost estimates, and
- Tender documents etc.

Project implementation:

- Supervision of project execution.
- Assistance in project operation for initial period.
- Execution of training programs.
- Institution building or financial studies for successful implementation of the project.

Special services:

- Environmental evaluations

- Forensic engineering
- Geotechnical engineering
- Operational assistance
- Process design, pilot studies, computer modeling
- Safety engineering
- Surveying engineering
- Toxic and hazardous waste evaluation
- Permit and application services

o Performance Models

Vroom (1964) suggested on the basis of a number of experiments that the effects of motivation on performance are dependent on the level of ability of the worker, and the relationship of ability to performance is dependent on the motivation of the worker. He suggested a multiplicative relationship:

Performance = ζ (ability) x (motivation).

Porter and Lawler (1968), in their study of the relationships between motivation and performance, presented a conceptual model. Their model suggested that there are two factors determining the effort people put into their jobs: the value of the rewards to the individual insofar as they are likely to satisfy their needs, and the probability that rewards depend on effort, as perceived by the individual. They suggested two additional variables to effort that affect task achievement ability and role perceptions. They formulated the relationship:

Performance = ζ (effort) x (ability) x (role perception).

In construction-related studies, *Laufer and Borcherding (1981)* focused on the effects of financial incentives on productivity, using the performance determinants: performance = ζ (ability) x (motivation) x (role perception X facilitating and inhibiting conditions not under the control of the individual).

They suggested that the last two variables in the equation depend, to a large degree, on the quality of management and concluded that there are three main factors influencing construction workers' performance: ability, motivation, and quality of management *(Laufer and Borchcrding 1981)*. Maloney and McFillen presented a model of worker performance and reported research that validates the model within a construction context *(Maloney and McFillen 1983, 1986)*.

The model identifies four variables that influence the level of worker performance:

1. The worker's motivation as evidenced by the worker's effort.
2. The degree to which the worker possesses the requisite job specified knowledge and skills.
3. The degree to which the worker possesses the requisite innate mental and physical abilities.
4. The effectiveness of management in organizing the work and providing the necessary resources. *(Refaat, 1997)*

Performance Evaluation

The ultimate objective of CONSULTANT PERFORMANCE EVALUATION is to improve the quality of professional services. (FIDIC, 2001).

The sub-objectives would normally include:

- Improvement of performance on the specific project assignment
- Achievement of better results and increased efficiency for the money invested

- Record(s) of performance for the purpose of qualifying consultants for future assignments *(FIDIC, 2001).*

The objectives of performance reporting are to have implemented procedures for measuring and reporting consultant performance. Its intention is to:

- Encourage consultants to implement a business culture of continuous improvement to benefit themselves and their clients.
- Provide the owner with performance scoring data from past and current contracts and engagements to identify the best performing consultants.
- Ensure that the best-performing pre-registered consultants are offered more business opportunities with the owner than other consultants.
- Share information on past and current consultant performance with other clients. *(FIDIC, 2001).*

The Process of Performance Evaluation

Benefits of Performance Reporting

- Consultants can secure more business opportunities due to favorable Performance Reports, as past performance is taken into account whenever tender panels are chosen and tenders are evaluated.
- Performance Reports, particularly those prepared at the completion of a consultant engagement may be used as an endorsement when marketing services to clients.
- Concerns about unsatisfactory performance are raised at the earliest opportunity, when there is the greatest scope for improvement.
- Participation in regular performance monitoring and formal reporting encourages cooperative contracting through proactive and constructive discussion at the project level.
- Performance reporting helps consultants demonstrate their commitment to a culture of continuous improvement.
- Performance reporting will particularly benefit consultants already committed to a corporate culture of continuous improvement and client satisfaction, as it assists them to identify those aspects of their performance requiring improvement.
- Maintaining records of Performance Reports will assist consultants to monitor performance trends over the longer term, to set targets for performance improvement and to identify and correct adverse trends at the earliest opportunity.
- Performance Reports provide the basis for consultants to periodically discuss their performance and business relationships with the clients at a senior management level. *(FIDIC, 2001).*

The Consultant Contract

the Consultant's Contract should clearly indicate. Keeping in mind:

- The proposal leading to the contract
- Requirements for local associates (including names and participation of local associates/sub-associates/subcontractors)
- Identification of Lending Agency, Borrower/ Client, and Consultant's key personnel
- Scope of work
- Terms of reference
- Required standards of performance
- Time constraints

- Costs
- General and specific conditions
- Schedules and budget
- Material and services to be supplied by the Borrower/Client
- End products to be supplied by the consultant.

COSULTANT PERFORMANCE MEASUREMENT

Accurate measurements should provide not only the measures are but also how well they differentiate performance. Forty-two (42) measures for evaluating A/E consultants' deliverables and work processes were developed, adapted from previous paper *(Chang and Ibbs, 1999).* Those measures are shown in Figure (2.1)

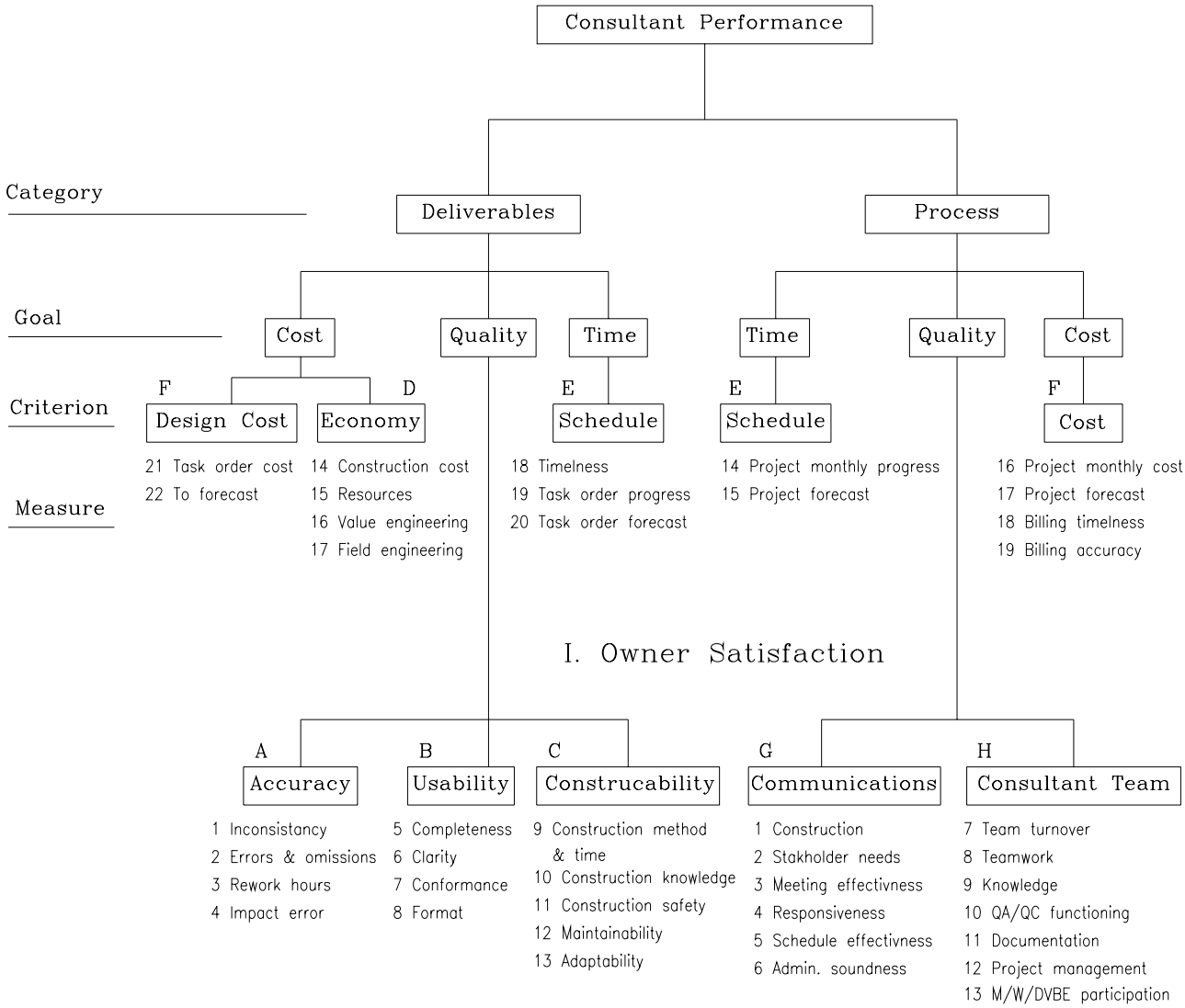

Figure 2.1: Consultnat's Performance Measurement Framework (adapted from *Chang and Ibbs, 1999*).

3. CONSULTANT PERFORMANCE EVALUATION CRITERIA

The criteria were classified into two broad categories (Fig. 2.2) including those related to:

1. Various stages of a project, feasibility, design, bidding, construction, and post construction;
2. General performance (project resources, programming, relationship, etc.)

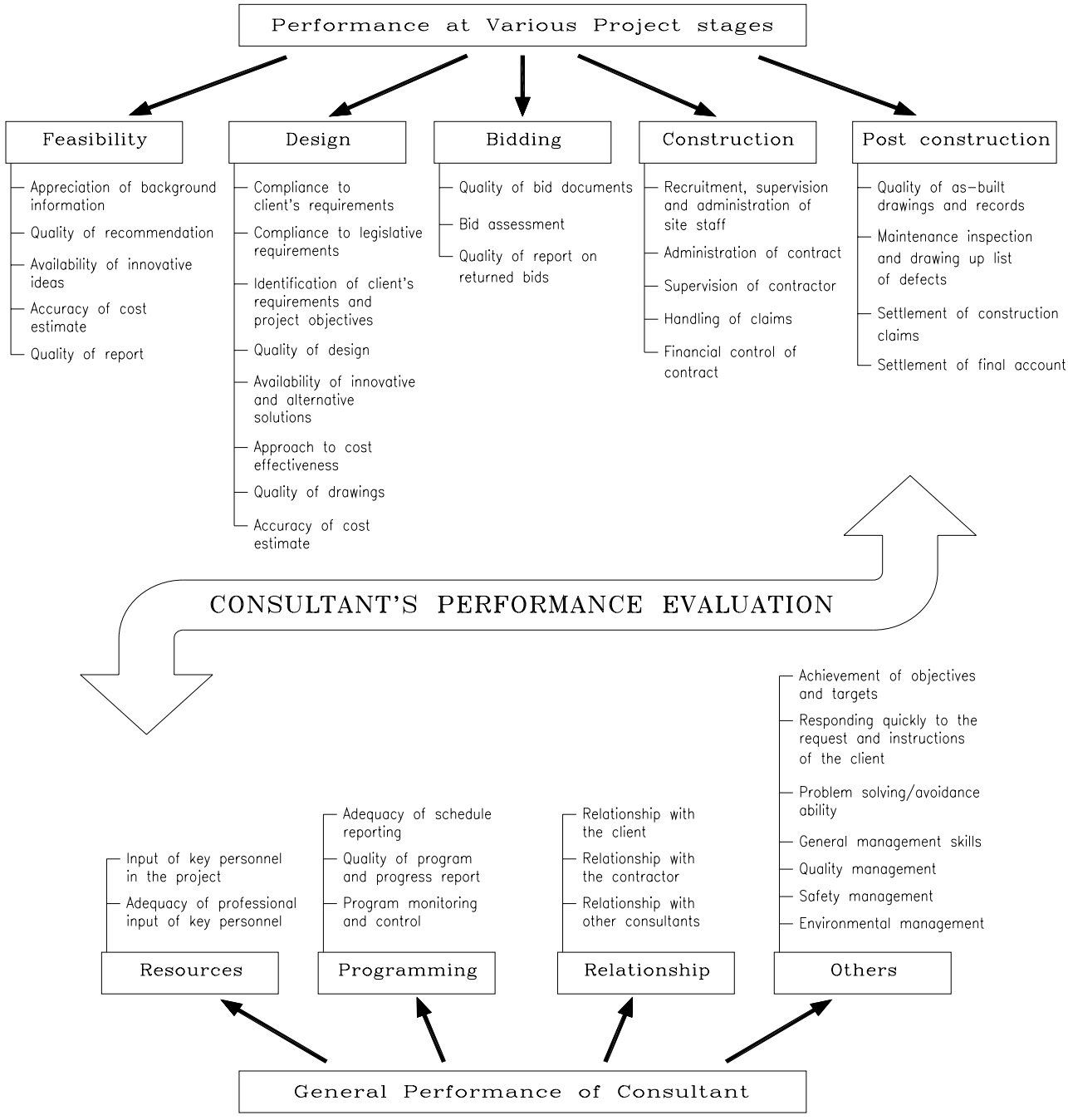

Figure 2.2: Consultnat's Performance Evaluation Categories and Criteria (adapted from *Thomas and Lai-Kit, 2004*).

List of consultant performance evaluation criteria

No.	consultant performance evaluation criteria	Stage / Capability
1	*Appreciation of background information*	*Feasibility*
2	*Quality of recommendation*	*Feasibility*
3	*Availability of innovative ideas*	*Feasibility*
4	*Accuracy of cost estimate*	*Feasibility*
5	*Quality of report*	*Feasibility*
6	*Compliance to client's requirements*	*Design*
7	*Compliance to legislative requirements*	*Design*
8	*Identification of client's requirements and project objectives*	*Design*
9	*Quality of design*	*Design*
10	*Availability of innovative and alternative solutions*	*Design*
11	*Approach to cost-effectiveness*	*Design*
12	*Quality of drawings*	*Design*
13	*Accuracy of cost estimate*	*Design*
14	*Quality of bid documen*ts	*Bidding*
15	*Bid assessment*	*Bidding*
16	*Quality of report on returned bids*	*Bidding*
17	*Recruitment, supervision and administration of site staff*	*Construction*
18	*Administration of contract*	*Construction*
19	*Supervision of contractor*	*Construction*
20	*Handling of claims*	*Construction*
21	*Financial control of contract*	*Construction*
22	*Quality of as-built drawings and records*	*Post construction*
23	*Maintenance inspection and drawing up list of defects*	*Post construction*
24	*Settlement of outstanding claims*	*Post construction*
25	*Settlement of final account*	*Post construction*
26	*Input of key personnel in the project*	*Cons. General Resources*
27	*Adequacy of professional input of key personnel*	*Cons. General Resources*
28	*Adequacy of schedule reporting*	*Cons. Programming*
29	*Quality of program and progress report*	*Cons. Programming*
30	*Program monitoring and control*	*Cons. Programming*
31	*Relationship with the client*	*Cons. Relationship*
32	*Relationship with the contractor*	*Cons. Relationship*
33	*Relationship with other consultants*	*Cons. Relationship*
34	*Achievement of objectives and targets*	*Other Capabilities*
35	*Responding quickly to the request and instructions of client*	*Other Capabilities*
36	*Problem solving/avoidance ability*	*Other Capabilities*
37	*General management skills*	*Other Capabilities*
38	*Quality management*	*Other Capabilities*
39	*Safety management*	*Other Capabilities*
40	*Environmental management*	*Other Capabilities*

Practical Usage of Performance Evaluation

As shown in Figure. 3.1, the CPE scores can be utilized for various purposes, including

1) monitor and control
2) Incentive and sanction
3) Pre-selection
4) Technical assessment
5) Bid evaluation.

The cycle will reiterate again once an assignment is awarded to a particular consultant.

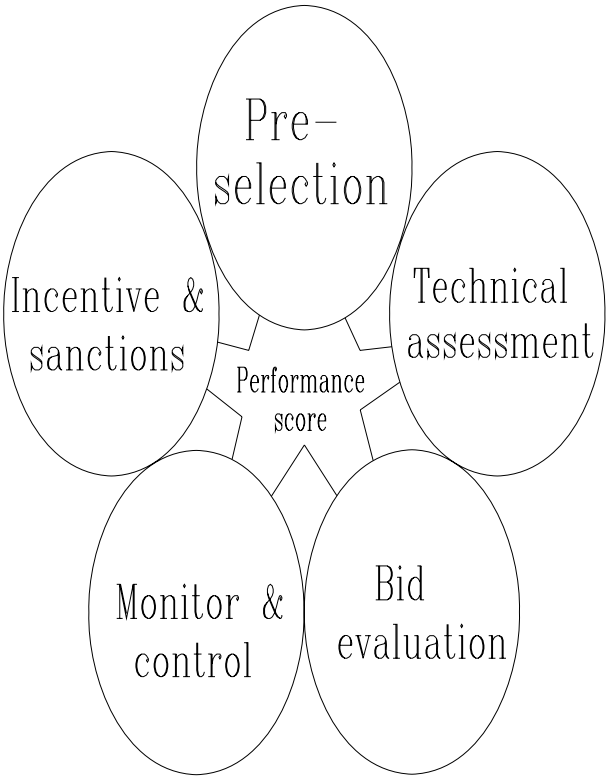

Figure 3.1 : Practical Usage of Consultant's Performance Evaluation
(adapted from *Thomas and Lai-Kit, 2004*)

4. RESEARCH METHODOLOGY

The literature reviews and previous study done in Hong Kong by *(Thomas and Lai-Kit, 2004)* are the major resources to obtain the list of criteria which may taken into consideration while evaluation of consultant performance. The method of approach of acquiring data consists of the following resources:

1. Literature review, previous study done, and discussions with professionals in the construction industry.
2. Consultant Performance Evaluation forms used worldwide.
3. A questionnaire, which is the output of the literature review and previous study.

The research methodology is distributed into the following phases of research program as shown in the following flowchart:

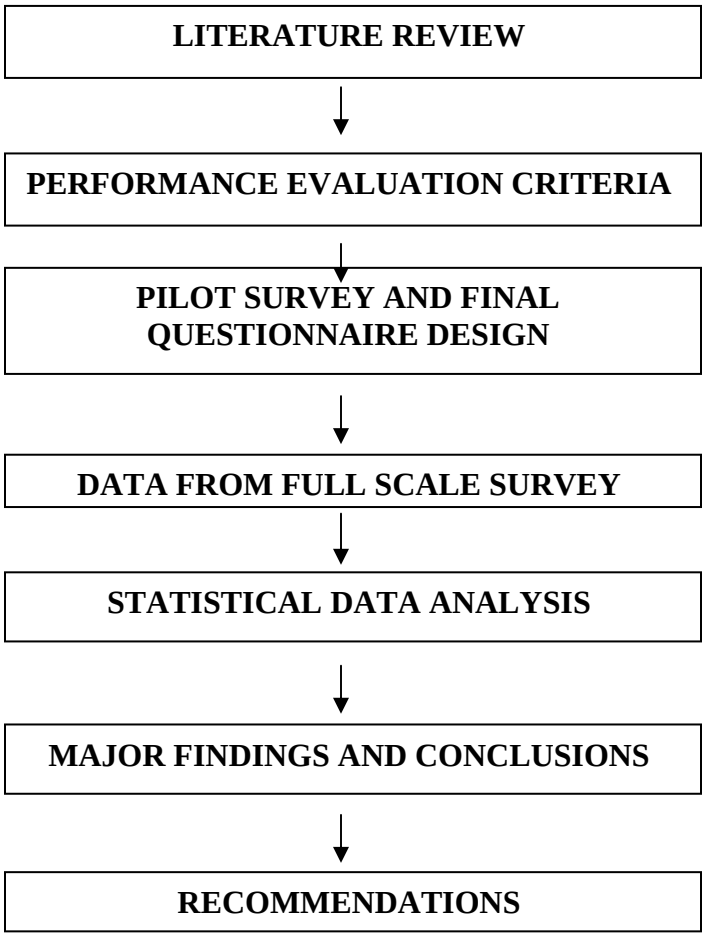

Figure 4.1: Research Methodology

Questionnaire Design

The questionnaire preparation took into consideration the main performance evaluation criteria adapted previously and comments from six experts' interview during the pilot study. There were two copies of questionnaire forms, one in Arabic and the second in English, to make the thesis topic easily understood by respondents.

There are two main parts in the questionnaire. The first part contains general information questions including specialization, experience and nationality of the company. The respondent was requested to choose the most appropriate answer. The second part concerns the weight importance of each consultant performance criteria. For each question, the respondent had five options, “Extremely Important” , ”Very Important” , “Important” , “Somehow Important”, and “Not Important”.

POPULATION AND SAMPLE SIZE

There research population is limited to the four restrictions were identified earlier, which are.

1. The contractor selected will be large construction contractors (Grade 1, 2 or 3) as classified by the Ministry of Municipalities and Rural Affairs (MOMRA).
2. The consultants selected will be reputable and have past experience of more than 10 years in the construction field.
3. All building projects built only in the Eastern province of Saudi Arabia.
4. Building construction projects of 10 million Saudi Riyals or more.

According to those restrictions, the list of consultants and contractors as presented in the Chamber of Commerce and MOMRA classifications was searched. The list includes (72) consultants and (148) contractors in the Eastern Province of Saudi Arabia.

The sample size required for the research was determined based on the statistical principles to reflect a confidence interval of 95%. The sample was determined using the equation given by *(Kish, 1995)*

$$n_0 = \left(\frac{p * q}{V^2} \right) \qquad \text{(Eq. 3.1)}$$

$$n = \frac{n_0}{\left(1 + \frac{n_0}{N} \right)} \qquad \text{(Eq. 3.2)}$$

Where:

N = Population size

n = Sample size

n_0 = Sample size from an infinite population

V = Maximum standard error allowed

p = Proportion of characteristic being measured in the target population

q = Compliment of p (i.e. 1-p)

To maximize n, p is set to be 0.5. The target populations N are 72 and 148 for consultants and contractors respectively. To account for more error in qualitative answers of this questionnaire, maximum standard error V is set at 10% or 0.1. Substituting in Equations 3.1 and 3.2 above, minimum required sample is calculated to be 18.55 and 21.38 for consultants and contractors respectively. This means that minimum sample size for consultants’

population is 19 and minimum sample size for contractors' population is 22.

For owners' population, only public owners dealing with large building projects (10 million SR and above) were considered (i.e. Saudi Aramco, SEC, Sabic ... etc.). A total population of 88 owners is dealing with large projects (AI-Juwairah, 1997). Using the same formula mentioned above, about 13 owners dealing with large projects in the Eastern Province of Saudi Arabia can be taken as sample size.

Data Gathering

the majority of data was collected by the method of meetings, emails, and by faxes.

about 180 engineers are working in the construction industry and distributed among the main three categories (consultants, owners, and contractors).

total final number of respondents, which is taken into statistical data analysis, is 35 consultants, 35 contractors, and 30 owners.

SCORING SYSTEM

For the first part of the questionnaire, no scoring was used since this consisted of general information related to respondents' companies and characteristic's of the project. For the second part of the questionnaire, the weight importance of the criteria was considered. They were then organized according to their importance level

The scale interval value assigned for each response appearing in the questionnaire is as follows in Table:

Extremely important	X1	100%
Very Important	X2	75%
Important	X3	50%
Somehow Important	X4	25%
Not Important	X5	0%

Importance Index will be calculated using the following formula:

Imp Ind = 100 X1 + 75 X2 + 50X3 + 25X4 +0X5 / (x1+ x2 +x3 + x4 + x5) … (Eq.3.3)

Where:

Imp Ind: Importance Index

X1: Number of respondents answering "Extremely Important"

X2: Number of respondents answering "Very Important"

X3: Number of respondents answering "Important"

X4: Number of respondents answering "Somehow Important"

X5: Number of respondents answering "Not Important"

STATISTICAL TECHNIQUES

$$\overline{X} = \left(\sum (fX)_n\right) / n \qquad \text{(Eq. 4.1)}$$

Where,

$\overline{X}$ = the weighted mean

$X_n = 0$ (scoring scale for Not Important)

$X_n = 1$ (scoring scale for Somehow Important)

$X_n = 2$ (scoring scale for Important)

$X_n = 3$ (scoring scale for Very Important)

$X_n = 4$ (scoring scale for Extremely Important)

f = frequency of each observation of each criterion

n = number of observations for each criterion (total respondents = 100)

$$S_n^2 = [\sum f_i (X_i - \overline{X})^2/(n-1)] \quad \text{(Eq. 4.2)}$$

Where:

S_n = Standard Deviation for each Criterion

n = number of observation for each Criterion (total =100)

95% confidence interval

$$= \overline{X} \pm 1.96 * S_E \quad \text{(Eq. 4.3)}$$

Where:

$\overline{X}$ = the weighted mean

S_E = The Standard Error of Mean

$$S_E = \frac{S_n}{\sqrt{n}} \quad \text{(Eq. 4.4)}$$

Where:

S_E = Standard Error of Mean

n = number of observation for each Criterion (Total Respondents =100)

Coefficient of Variance (C.V) = $S_n / \overline{X}$ (Eq. 4.5)

Where:

S_n = Standard Deviation

$\overline{X}$ = the weighted mean

4.1.1.1 Kendall's Correlation Coefficient

Using data obtained from Table 4.9 through Table 4.12, we can calculate the Kendall's Correlation Coefficient using Equation 4.6 as follows:

(Γ_1) Between Consultants and Owners = $\frac{4692}{40(40^2-1)/12} = 0.88$

(Γ_2) Between Consultants and Contractors = $\frac{4579}{40(40^2-1)/12} = 0.859$

(Γ_3) Between Owners and Contractors = $\frac{4700}{40(40^2-1)/12} = 0.882$

(Γ_4) Among all Respondent Parties = $\frac{4432.67}{40(40^2-1)/12} = 0.832$

The above value of the Kendall's correlation coefficient indicates a **strong positive correlation** between the each group of respondents and among all participated respondents.

5. RESEARCH FINDING AND RESULTS

CONSULTANTS' PERSPECTIVE

The arrangement of project stages as per their weighted importance is:

- Construction stage
- Design stage
- Bidding stage
- Post construction stage
- Feasibility stage

Also, the five most important consultant performance evaluation criteria identified by consultants are listed below:

1. Quality of design
2. Recruitment, supervision and administration of site staff
3. Supervision of contractor

4. Compliance to client's requirements
5. Quality of bid documents (working drawings, BOQ. etc.)

According to the ranking by the Consultant Criteria Evaluation, the most important criterion was (Quality of design).This may reflect on the consultants' opinion of the importance of project design and its effect on all other project issues. However, there are also some criteria ranked which have relation with other project stages like Biding and Construction stages.

On the other hand, the least important criteria ranked were:

1. Environmental management
2. Availability of innovative ideas
3. Relationship with other consultants
4. Relationship with the contractor
5. Availability of innovative and alternative solutions

The above mentioned least important criteria ranking gives us an idea about consultant beliefs. They believed that environmental management is not related to their performance evaluation and may be someone else, like the contractor, should be concerned about it.

OWNERS' REPRESENTITATIVES PERSPECTIVE

The arrangement of project stages as per their weighted importance is:

- Design stage
- Construction stage
- Bidding stage
- Post construction stage
- Feasibility stage

Also, the five most important consultant performance evaluation criteria identified by owners are listed below:

1. Problem solving/avoidance ability
2. Appreciation of background information
3. Compliance to client's requirements
4. Recruitment, supervision and administration of site staff
5. Quality of design

According to the ranking by Owners' Criteria Evaluation, the most important criterion was problem solving/avoidance ability. This may reflect that owners need to avoid any problems which may occur during construction. However, there are also some criteria ranked that have a relation with other owners' personal issues, such as their requirements and consultant background information.

On the other hand, the least important criteria ranked were:

1. Availability of innovative ideas
2. Input of key personnel in the project (using his experience and capabilities)
3. Environmental management
4. Relationship with other consultants
5. Approach to cost-effectiveness

Owners believed that there is no need for innovative ideas by consultants during the project feasibility stage. Owners believed that it will not affect project

quality or consultant performance evaluation as it is related to the first stage of the project.

CONTRACTORS' PERSPECTIVE

The arrangement of project stages as per their weighted importance is:

- Design stage
- Construction stage
- Bidding stage
- Post construction stage
- Feasibility stage

Also, the most important consultant performance evaluation criteria identified by contractors are listed below:

1. Quality of design
2. Compliance to client's requirements
3. Quality of bid documents (working drawings, BOQ. etc.)
4. Quality of drawings
5. Supervision of contractor

The most important criteria chosen by contractors were basically related to their jobs. They selected all criteria to avoid any problems during their involvement in the project. Quality of design is the most important criteria they selected to avoid any problems or owners' changes during the construction stage

On the other hand, the least important criteria ranked were:

1. Environmental management
2. Relationship with other consultants
3. Relationship with the contractor
4. Approach to cost-effectiveness
5. Availability of innovative ideas

Contractors believed, like consultants, that the environmental management criterion is not important for consultant performance evaluation. They may think that this should be handled by someone else who is a specialized professional in this field.

OVERALL RESPODENTS' PERSPECTIVE

Criteria No.	Criteria	Imp. Index %	Rank
9	Quality of design	88.00	1
6	Compliance to client's requirements	86.75	2
14	Quality of bid documents (working drawings, BOQ. etc.)	85.75	3
17	Recruitment, supervision and administration of site staff	85.75	4
19	Supervision of contractor	85.75	5
1	Appreciation of background information	84.75	6
8	Identification of client's requirements and project objectives	83.75	7
12	Quality of drawings	83.50	8
36	Problem solving/avoidance ability	83.00	9
34	Achievement of objectives and targets	81.50	10
18	Administration of contract	79.25	11
38	Quality management	77.25	12
13	Accuracy of cost estimate	77.00	13
31	Relationship with the client	77.00	14
7	Compliance to legislative requirements	76.75	15
23	Maintenance inspection and drawing up list of defects	76.50	16
30	Program monitoring and control	76.50	17
22	Quality of as-built drawings and records	76.00	18
35	Responding quickly to the request and instructions of client	75.75	19
39	Safety management	75.50	20
27	Adequacy of professional input of key personnel	75.00	21
5	Quality of study report	74.00	22
25	Settlement of final account	74.00	23
15	Bid assessment (quality of bidding control)	73.50	24
28	Adequacy of schedule reporting	73.50	25
4	Accuracy of early cost estimate	73.25	26
37	General management skills	73.25	27
29	Quality of program and progress report	72.57	28
2	Quality of recommendation during study	72.00	29
20	Handling of claims	72.00	30
24	Settlement of claims	71.50	31
16	Quality of report on returned bids	71.25	32
21	Financial control of contract	70.25	33
10	Availability of innovative and alternative solutions	69.00	34
26	Input of key personnel in the project(using his experience and capabilities)	69.00	35
32	Relationship with the contractor	66.25	36
11	Approach to cost-effectiveness	66.00	37
33	Relationship with other consultants	63.00	38
40	Environmental management	61.50	39
3	Availability of innovative ideas	58.61	40

COMPARISON BETWEEN SAUDI'S AND JOINT VENTURE'S ENGINEERS RESPONSES

The most important consultant performance evaluation criteria identified by Saudi's organizations respondents are listed below:

1. Quality of design
2. Recruitment, supervision and administration of site staff
3. Appreciation of background information
4. Compliance to client's requirements
5. Supervision of contractor

On the other hand, the most important consultant performance evaluation criteria identified by joint venture's organizations respondents are listed below:

1. Compliance to client's requirements
2. Quality of bid documents
3. Quality of design
4. Supervision of contractor
5. Safety management

Those differences may be come as the two organization types, Saudi and joint venture, are different in their skeleton and targets. Also, the mixture of joint venture organizations employee may has an important role in their opinions. There is a big difference between the two groups opinion about (Safety management) criterion. The joint venture's respondents evaluated it as the fifth important evaluation criteria while the Saudi's organizations' respondents evaluated it as the twenty fifth criterions.

6. COMPARISON WITH PREVIOUS STUDY DONE IN HONG KONG

Thomas and Lai-Kit (2004) had finished the same study of evaluation of consultant performance in Hong Kong. They had only two groups of respondents (Consultants and Clients)

Ranking of the most important criteria can used for consultant performance evaluation identified by overall respondents' perspectives in both studies is shown below.

Overall Respondents' Ranking of both Studies

R	Recent Study in Saudi Arabia	Previous Study in Hong Kong
1	9. Quality of design	34. Achievement of objectives and targets
2	6. Compliance to client's requirements	6. Compliance to client's requirements
3	14. Quality of bid documents	14. Quality of bid documents
4	17. Recruitment, supervision and administration of site staff	7. Compliance to legislative requirements
5	19. Supervision of contractor	8. Identification of clients' requirements and project objectives

There are big differences between both study respondents' opinions about the importance of consultant evaluation criteria. Those differences may represent the actual difference between the construction industry issues in both study regions. However, there are some

agreement between both groups about importance of some criteria like *Compliance to client's requirements* and *Quality of bid documents*.

7. SUMMARY AND CONCLUSION

The main objective of this research was to identify the main criteria used to evaluate the engineering consultant performance in the Saudi Arabian construction process, and to determine the importance of each criterion on the engineering consultant performance evaluation.

There is a high agreement between all professionals who participated in this research survey with the importance of the criteria identified. However, there are some differences in their opinion about some criteria. On the other hand, a comparison was assessed between recent study and a previous study done in Hong Kong by *(Thomas and Lai-Kit, 2004)*. The results of this comparison showed that there are big differences between participated respondents in their opinions about the importance of consultant evaluation criteria.

Based on the data analysis and the results of this research, the following conclusions are selected and summarized:

1. According to overall respondents' perspective, the arrangement of project stages as per their weighted importance is:
   - Design stage
   - Construction stage
   - Bidding stage
   - Post construction stage
   - Feasibility stage
2. The five most important consultant performance evaluation criteria identified by all respondents (Consultants, Owners, and Contractors) were:
   - Quality of design(Design Stage).
   - Compliance to client's requirements (Design Stage).
   - Quality of bid documents (working drawings, BOQ. etc.) (Bidding Stage).
   - Recruitment, supervision and administration of site staff (Construction Stage).
   - Supervision of contractor (Construction Stage).
3. The five least important consultant performance evaluation criteria identified by all respondents (Consultants, Owners, and Contractors) were:
   - Availability of innovative ideas (Feasibility Stage)
   - Environmental management (Other Consultant Capabilities)
   - Relationship with other consultants (Consultant Relationship)
   - Approach to cost-effectiveness (Design Stage)
   - Relationship with the contractor (Consultant Relationship)

8. RECOMMENDATIOS

As a result of this research survey, the following recommendations are set to help construction parties evaluate the consultant performance and to improve it in reference to the various project stages:

1. Consultant characteristics have to be studied carefully from the owners' side

before awarding a contract and starting the project stages.

2. As Quality of Design is the most important consultant performance evaluation criteria, consultants should improve their capabilities in design and its quality issues.
3. Before project construction, careful and proper review of project design by all parties in the construction industry can improve overall consultant performance.
4. Consultants need to carefully consider their clients' requirements when they design the project to ensure that it meets their requirements and objectives.
5. Training courses are very important issues to improve the consultant performance.
6. Responsibilities of the consultant should be clearly understood by owners and other parties during all project stage.
7. Consultancy organization should invest in development, training, and acquire requirements needed for design improvement and quality supervision.

RECOMMENDATIOS FOR FURTHER STUDIES

The following areas are recommended for further studies based on the results of this study:

1. Further studies could be conducted on the methods required to improve overall consultant performance.
2. The detailed evaluation of consultant performance during project design and construction stages.
3. As the scope of this study is limited to large construction building projects in the Eastern Province of Saudi Arabia, it is therefore recommended to make similar studies in other construction project types and in different regions of Saudi Arabia.
4. Researches can be carried out on different consultancy issues, construction management, and different project performance types.

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