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This paper summarizes the Thesis submitted by Mr. Mubarak Faraj Saeed Al-Besher on the subject of a conceptual model for consultant selection in Saudi Arabia.

ABSTRACT

As the public sector considers engaging consultants (A/E's) for professional services, many factors participate in making the A/E selection process much inconsistent and complicated. Therefore the public sector is in the need for a consistent comprehensive selection of A/E. This research is directed towards the improvement of the selection process. Thirty public sector organizations were surveyed and their criteria for selection of the consultant were identified. These criteria were combined with the Analytic Hierarchy Process (AHP) theory concept in structuring the A/E consultant selection model (CCSM).

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1. INTRODUCTION

The launching of government's massive construction programs (1970-1985) indicated the lack of adequately trained, qualified, and experienced engineers and construction specialists required for the implementation of construction programs. Such construction programs expanded engineering and construction programs and responsibilities. The lack of in-house experience forced the public sector to limit the in-house engineer's responsibilities only to contract administration and to seek external professional consultations from the local and foreign consulting firms.

Although, the public sector in-house engineering departments' design capabilities and experience have rapidly improved over the past years as planned by government, which recognized the great importance of, local A/E's to gain the required experience, yet the needs for specialized A/E's services have continued. Therefore the public sector continues to retain and select from the local and multinational A/E's following inconsistent and unstandrized selection processes. These selection processes are bound by Saudi recruitment regulation. (**Zahlan, 1989**)

As the public sector considers the selection and engagement of A/E, many factors contribute in making the selection process very inconsistent and complicated. The factors are the large and complex projects, phenomenal technical changes in industries, essence of time, needs for specialized technical expertise, the political needs or legal constraints and the presence of serious problems in many technical areas requiring solutions beyond the capabilities of regular in-house engineers. The above-mentioned factors have necessitated a structured method for selecting the most qualified A/E from the long list containing many A/E's with almost identical qualifications and work experience. (**Aje &Tufte 1988**)

The success of A/E selection process depends on the well-developed methodology based on comparing the selection alternatives in terms of their related criteria. This methodology, if properly conducted, will be an efficient tool to control construction obstacles and to prevent or at least restrict the selection of incompetent, inexperienced and under-financed consultants. It will engage

only the A/E's that meet the owners' needs through a systematic selection method based on the A/E's professional abilities and technical competence. (**Foden, 1991**)

Regardless of public sector managerial capability, the A/E selection process is not an easy task considering the difficult and comprehensive evaluation of related complex criteria. This difficult task exposes the public sector to a multiple criteria decision-making problem due to extreme difficulties in defining, evaluating and comparing a number of alternatives (A/Es) competing against each other to win the overall objective of the selection **"*the award of the proposed project*"**.

In Saudi Arabia there are many factors that contribute to difficulties of A/E selection. Such factors include circulated directives of the Saudi Council of Ministers and the increased numbers of specialized local and international A/Es with almost identical qualifications and experience. The below-mentioned factors are causing poor A/E selection and other disadvantages such as;

- Low quality of services.
- Poor quality design.
- Inaccurate estimate of construction costs.
- Poor quality of contract documents.
- High process due to possible pre-arrangement between the A/Es.
- Exclusion of good experienced A/Es.
- Increased construction and life cycle costs.
- Deteriorated A/E-owner relationship.

This makes it clear that the public sector organizations need to develop a consistent, comprehensive and flexible multiple criteria decision-making model that will solve the consultant's (A/E) selection problem. The proposed model must help systemically pre-qualify and permit the selection of most qualified consulting firm (A/E) taking into account related and controlling factors for A/E selection based on ability.

Thus the objective of the research can be stated as:

1. **To identify the selection criteria which are accounted to be the major factors influencing the A/E selection process and determine the best A/E.**
2. **To develop a conceptual AHP model for solving the A/E selection problem to help the public sector in prequalifying and selecting the qualified A/E's that are financially capable and technically strong.**

2. LITERATURE REVIEW

2.1 Definition of Consultant

Generally, the consulting engineer is defined as a professional who mainly has 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.

2.2 A Consultant's Clients

Public organizations are the main source for the projects and hence the A/E's services are in demand among public sectors. **(Al-Mussalami, 1992)**. Regardless of size of the A/E firm, specialty, the form of the organization, the experience and qualification of staffs, the A/E firm renders professional services to any of the following clients:

- Government agencies.
- Private owners.
- Semi-public sector.
- Industry & commerce.
- Other professionals.

2.3 Consulting Services

The A/E who's professional experience, technical and specialized services are required in all construction phases can provide professional services depending upon the contractual relationship involved with the clients. However, the A/E's service may range from the comprehensive services to life cycle costing. **(Al-Mussalami, 1992)**. The types of A/E firms have been divided into four major categories depending on the owner(s) and the firm(s) nationality. These major categories are:

- Saudi Engineering Office.
- Saudi Consulting Office.
- Non-Saudi Engineering Office.
- Foreign Consulting Office.

2.4 Selection Methods

Regardless of the type of selection methods used, the nature of project, the contract and owners will always influence the selection methods. However, the best selection method is the one where A/Es are selected on the basis of their professional qualifications and competence. The A/E's competence and qualifications are evaluated to meet the owner's needs and to ensure they satisfy the project's specific requirements.
(Adrian, 1981), (Cushman & Plamer, 1980), (Abolnur, 1994)

Direct Selection is done on the basis of the A/E reputation, the owner's prior experience with A/E, or a former satisfied client's recommendation. This method is used to serve the large and well-established A/E firms rather than the small ones. **(Adrian, 1976)**.

Competitive Selection includes selections based on fee and design submissions by A/Es. *Fee selection* is controversial and mostly opposed by many officials and design professionals. It requires a clear definition of the needed service, which may be impossible.
(Cushman & Plamer, 1980), (FFIIC, 1991)

Design competition is less controversial than fee competition. It is preferred by A/Es because they are competing in what they do best and only the best will prevail.

Comparative Selection is based on objective evaluation of the A/E's qualifications and technical experience. All A/E's are carefully reviewed and up to five of them are selected to submit technical proposals taking in account the following criteria:

- Experience.
- Availability of resources.
- Capacity to complete the work.
- Compatibility.

- Design capability.
- Specialization.
- Professional standing.

The final A/E selection will be based upon the outcome of evaluating the above and possessing a good standing in technical competence, professional experience, business capacity, creativity and ability.

2.5 Previous Studies

Many studies have been conducted on consulting and engineering practices. An examination of the literature currently available has revealed that A/E selection procedures have been developed to assist the public sector organizations in A/E pre-qualification and selection. However, in Saudi Arabia no specific and detailed studies have been done into A/E pre-qualification and selection.

Frederick (1991) and **Abolnour** (1994) indicated that, when the design budget is allocated for a new project and the need for A/E services are confirmed, one of the first tasks for the public sector is selecting a suitable A/E from a long list of candidates. This results in the selection and engagement of the most qualified A/E, which establishes the project quality from the earliest stage.

When **Al- Musallami** (1992) conducted a study on the consultancy practice in Saudi Arabia, he concluded, "*The public clients are the major users of A/E design services*". This is due to the fact that the project size and design complexity, demand for specialized services that are beyond the in-house design capabilities within the public sector, but offered by some expatriate and local A/Es in the private sector.

Al-Subiae (1987) and **Moore** (1986) indicated that construction claims, disputes, owner's dissatisfactions, litigation, A/E design errors, conflicts and ambiguities between contract documents and drawings can be avoided only by the proper selection of well-qualified A/E.

Al-Shiha (1993) conducted research on the effect of faulty design and construction factors on the maintenance of facilities. One of his strongest conclusions is that A/E poor selection effects not only the design and construction stages of the projects, but also forms a major foundation for financial obstacles causing a gradual increase in the running or maintenance costs of buildings and may shorten the effective life span of the facilities.

Al-Saleh (1980) indicated that government's officials and engineers are dissatisfied with the A/E selection process and criticized it. He believes that "*the A/E selection should be based on the professional qualifications necessary for the satisfactory performance of the services required by the government agencies/ministries*"

William Moore (1986) indicated that compatibility; level of effort and pricing of the services are criteria that must be identified for selecting a qualified A/E firm and seeking a successful and constructive client-consultant relationship.

Aitath (1988) in studying the bid awarding system in Saudi Arabia and through the survey of the construction parties found that projects awarded only on the basis of the lowest bid had lower performance quality as compared to those awarded on the basis of proper qualifications and competence.

Cushman and **Plamer** (1980) indicated that an A/E's selection is of great importance to the owner's satisfaction. It should be done with comprehensive evaluation of an A/E's qualifications by exploring the A/E's ability to carry out the current and proposed work without affecting performance adversely.

DuWayne Kasma (1987) indicated that an A/E's skills and competence are essential factors for evaluating its abilities. Therefore the high quality

and success of professional services will depend on systematic A/E selection, considering the A/Es' competence and qualifications and not on the selection based on price competition.

The most highly recommended approach is to utilize and benefit from the multiple criteria decision-making process (**MCDM**). This approach will be flexible enough to accommodate as many related criteria as required by the public sector. (**Tufte, 1988**)

In Saudi Arabia, **Assaf** and **Jannadi** (1995) in their research titled "*A Multi-Criteria Decision-Making Model for Contractor Pre-Qualification Selection*", proposed a method for pre-qualification and selection of contractor in Saudi Arabia based on **MCDM**. Their method utilizes the multi-criteria decision approach to help owners make critical decisions successfully.

The Analytical Hierarchy Process (**AHP**), which was developed by the well-known mathematician **Thomas L. Saaty** is another powerful method found in current literature that was applied in the use of the multiple criteria approach for the alternative selection in the construction area.

Abdelrazig (1995) in his study titled "*A Computerized AHP Model for Solving Bid/No-Bid Decision Problem*" presented a structured methodology to help contractors in Saudi Arabia to make their decisions by using the AHP approach.

Mitta (1993) used AHP process to rank a set of five computer interfaces for an automated part recognition system. His study suggested that the selection be based on the usability and learn ability characteristics.

Riza and **Yvon** (1988) proposed a method for project evaluation and selection. He used the AHP instead of goal programming to set priorities and trade-off objectives.

Mustafa (1991) used AHP in the assessment of risk in constructing the Jamuna Multi-Purpose Bridge in Bangladesh.

In the military field, **Woo Lee** (1991) used the AHP approach in his study titled “Static Valuation of Combat Force Potential by the Analytic Hierarchy Process (AHP)” as a powerful tool in establishing the relative value of military weapon systems. He concluded that the AHP is the preferred approach for systematically accommodating the expertise of those people who must be involved in the evaluation of a wide range of heterogeneous weapons. The main aim of his study was the determination of the weapon’s quality performance.

3. RESEARCH METHODOLOGY

3.1 Introduction

The main objectives of this research were first of all to identify the major A/E selection criteria and using these selection criteria and the Analytical Hierarchy Process (**AHP**) to develop a consultant conceptual selection model (**CCSM**) to solve the A/E selection problems in Saudi Arabia. The CCSM will help the public sector in pre-qualifying and selecting the most "*Financially Capable and Technically Strong*" A/E or in other words the most qualified A/E.

3.2 Data Collection

The main sources for the required data for this research were the previous studies conducted on consultant selection (A/E), the prevailing or current selection practice in Saudi Arabia and the direct interviews conducted with the public sector construction professionals performing A/E pre-qualification and selection.

3.3 Survey

The approach system taken to achieve the two main objectives of this research was by conducting the survey and interviews as follows:

3.3.1 Stage One

In an attempt to achieve the first objective of this research, the data was gathered in three steps:

I Available literature on the consultants' pre-qualifications selection methods were comprehensively searched and studied to identify the major selection criteria.

II Data was gathered through direct interviews with construction professionals in the public sector and a sample of consultants.

III Samples of the public sector pre-qualification and selection process were examined to gather additional data and to check

the selection criteria used by the public sector organizations in their selection methods.

3.3.2.1 Stage Two

The selection criteria that were identified in Stage One were used as a basis for formulating the questionnaire form. Since there was no research done in Saudi Arabia in the field of "*A/E selection*", a small pilot study was conducted involving a sample of public sector representatives and consultants. The main objectives were:

- To make sure that the important A/E selection criteria were identified and comprehensively covered.
- To add more possible important criteria those were not included.
- Finalize the questionnaire form.

3.3.2.2 Stage Three

In this stage two steps were conducted:

I First, the questionnaire form was distributed to the thirty public agencies with approved budgets. They were asked to rate the selection criteria in order of importance and to add any criteria they might consider to be important to the A/E selection process.

II Second, two of the public sector organizations (PSO1 & PSO2) were selected to fill in their judgments of criteria and alternatives in the forms.

3.4 Scoring Method

Since the Analytical Hierarchy Process was used in the development of the model, the respondents had nine options for rating the criteria, which are as follows:

Intensity of Importance	Definition
1	Equal importance
3	Moderate importance
5	Strong importance
7	Very strong / demonstrated importance
9	Extreme importance
2,4,6,8	For compromise between the above

The Average Rank (A.R.), and Importance Index (I.I.) of the identified A/E selection criteria were calculated as follows:

Average Rank **(A.R.) = [$\sum_{i=1}^{n}$ (ai x Xi)/n]**. ……Eq**. 3.1**

Average Rank (A.R.) = (0x1)+(0x2)+(0x3)+(0x4)+(15x5)+(25x6)+(40x7)+
(10x8)+(0x9)/(0+0+0+0+15+25+40+10+0)
= 6.5

Importance Index **(I.I.) = [$\sum_{i=1}^{n}$ (ai x Xi)/n] X 100%**. ……Eq**. 3.2**

Where ai = constant expressing the weight given to i th response,
i = 1,2,3,4,5,6,7,8,9.

Xi = the variable expressing the frequency of the i th response,
for i = 1,2,3,4… And illustrated as follows:

X1 = 1 = the frequency of “Equally important”

X2 = 2 = the frequency of “Equally to moderately important”

X3 = 3 = the frequency of “Moderately important”

X4 = 4 = the frequency of “Moderately to strongly important”

X5 = 5 = the frequency of “Strongly important”

X6 = 6 = the frequency of “Strongly to very strongly important”

X7 = 7 = the frequency of “Very strongly important”

X8 = 8 = the frequency of “Very strongly to extremely important”

X9 = 9 = the frequency of “Extremely important”

I.I.= (A.R./9) * 100 = 6.5/9 *100 = 72.2%

Accordingly, if all parties answer any criteria by "*Equally Important*" then the Importance Index is = 1, which means that this criterion is not so relevant and is the last in the rank. On the other hand, if all answered by "*Extremely Important*" then the Importance Index is = 9, which means that this is the most important criterion and the first in the rank.

Finally, the agreement between the public sector and the consultants was measured quantitatively using the rank correlation theory. The Rank correlation coefficient was calculated as follows:

$$\textbf{Rho } (\rho) = 1-\{(6\Sigma D^2) / N (N^2-1)\}$$

Where;

D = Difference between the ranks given by the public sector and the rank given by the A/Es for individual criteria.

N = Number of the criteria, which in our case is 13.

3.3.3 Sample Size

In this research, the questionnaire (60) was distributed to Public Sector agencies and the sample of the consultants. In the selection process, there were two restrictions, namely;

- To public sector agencies with approved budgets. (30)
- To the consultants practicing in Saudi Arabia. (30)

In this research the population was divided into two (2) strata:

- Stratum I: The Public Sector Agencies.
- Stratum II: The Consultants.

For Stratum II, the A/Es' sample size to be surveyed was represented by thirty consultants (15 from Riyadh and 15 from Dammam). The selected consultants had a large volume of work with the public sector and the semi-public.

A total of 49 completed questionnaires were received back from the public sectors and the consultants. This represents 82% of the total distributed questionnaires.

3.6 Development of Conceptual Model for A/E Selection (CCSM)

To achieve the second objective of this research, the A/E selection criteria were identified and then these identified criteria were modified to suit A/E selection in Saudi Arabia. The final identified criteria, the Analytical Hierarchy Process (AHP) and computerized software "*Expert Choice Version 9.5*" based on AHP were used to develop the *Conceptual Consultant Selection Model* (**CCSM**). The significance of using the computer was simply to avoid excessive manual computation.

3.7 Application of CCSM Model

The Conceptual Consultant (A/E) Selection model (**CCSM**) was implemented by surveying Saudi industry experts (in public sector) to show the consistency and completeness of the model for A/E selection.

4. DATA ANALYSIS

4.1 Statistical Techniques

The collected data from the survey was analyzed and presented by using the following statistical methods:

1) The Weighted Mean comprised mainly the average (arithmetical mean), which was calculated as explained in section 3.4 of the previous chapter, using Eq. 3.1.
2) Standard Deviation was used in the arithmetical calculations required for later data analysis.

$$S_x = (\Sigma_{i=1}^{9} (W_h)^2 \times (S_h)^2)^{1/2} \qquad \text{Eq.4.1 (Livin, 1980)}$$

Where;

$W_h = N_h / N.$

S_x = Standard Deviation of the sample.

$S_h^2 = (X_{hi} - X_h)^2$

N = sample size.

3) Standard Error of Mean was used to describe the deviation of sample mean around their population mean.

$$S_x(X) = S_x / (N)^{1/2} \qquad \text{Eq.4.2 (Livin, 1980)}$$

Where;

S_x (X) = Sample Mean

N = Sample size

4) **95% Confidence Interval.**

The samples may not be a perfect indication of the population from which they are drawn. This means that we may never be sure how close the sample value is to the population value. While data from the sample would not determine the exact population value, yet this data can be used to estimate a value or an interval that is considered to contain the population value. The sample value is called *Point Estimate* and this

interval is called as *Confidence Interval* and its size depends on the degree of confidence desired in the sample results by the researcher.

95% Confidence Interval = X $\pm$ 1.96 (X) Eq.4.3 **(Livin, 1980)**

Where; X = sample standard error of mean.

5) **Coefficient of Variation**.

Coefficient of variation is a relative measure of the precision of the estimator (Public Sector or Consultant). It shows the magnitude of the deviation relative to the magnitude of the mean.

$C.V. = (S_x / X) \times 100\%$…. Eq.4.4 **(Livin, 1980)**

Where;

C.V. = Coefficient of Variation.

S_x = Standard Deviation.

X = Sample Mean.

4.2 Ranking

The measurement of the importance of each criterion was determined by the calculation of the average rank of each criterion. The methodology of calculating was explained in Section 3.4. Then, the criteria were ranked according to the highest average rank and the Importance Index.

4.3 Correlation

Correlation analysis is a statistical tool that can be used to describe the degree to which variables are linearly related to one another. One of the methods of measuring the correlation is to determine the Correlation Coefficient (**r**), which is used to find the degree of relationship existing among different factors or parties.

$r_s = 1-[6\ \mathbf{\Sigma d^2 / N (N^2-1)}]$…. Eq.4.5 **(Livin, 1980)**

Where;

r_s = coefficient of rank correlation.

d = difference between the rank of one variable and the rank of other

N = number of criteria.

4.4 Current A/E Selection Practice

The literature search and interviews conducted with both the public sector and consultants indicated that competitive selection process is currently the most widely used method among public sector organizations and the A/E fee is considered to be a major deciding factor that usually finalizes the selection process.

4.5 A/E Selection Criteria

As a result of the interviews conducted and the analysis of data, following criteria were identified and found to be the most important and commonly used by the public sector:

- Staff & Qualifications.
- Experience.
- Quality Performance.
- Project Management Capability.
- Past Performance.
- Quality Control.
- References.
- Current Work Load.
- Firm Organization.
- Firm Capacity.
- Economical Constraints.
- Experience in Geographical area.

STATISTICAL TECHNIQUES USED IN THE ANALYSIS OF DATA

NO.	Criteria Description	Mean	STD	STD Error of Mean	VAR	CV	95% Confidence Interval	
							Lower Limit	Upper Limit
CR.1	Current Work Load	6.93	1.23	0.17	1.50	17.71	6.60	7.25
CR.2	Experience	8.19	0.83	0.11	0.68	10.09	7.96	8.41
CR.3	Exp. In Geographical location	6.09	1.33	0.18	1.78	21.89	5.74	6.45
CR.4	Economical Constraints	6.44	1.77	0.24	3.12	27.41	5.97	6.92
CR.5	Firm Capacity	6.11	1.74	0.24	3.04	28.55	5.65	6.58
CR.6	Firm Organization	6.52	1.75	0.24	3.05	26.78	6.05	6.98
CR.7	Head Office Location	5.52	2.01	0.27	4.03	36.37	4.98	6.05
CR.8	Past Performance	7.37	1.48	0.20	2.20	20.12	6.97	7.77
CR.9	Project Management Capability	7.31	1.52	0.21	2.30	20.71	6.91	7.72
CR.10	Quality Performance	8.06	1.07	0.15	1.15	13.30	7.77	8.34
CR.11	References	7.63	0.90	0.12	0.80	11.75	7.39	7.87
CR.12	Staff & Qualification	8.15	0.90	0.12	0.81	11.03	7.91	8.39
CR.13	Quality Control	7.69	0.89	0.12	0.79	11.53	7.45	7.92

SUMMARY REPORT OF QUESTIONNAIRE

Rank	No.	Criteria Description	1	2	3	4	5	6	7	8	9	A.R.	I.I.
			NUMBER OF RESPONSES										
7	CR.1	Current Work Load	0	0	0	0	4	8	12	0	4	6.71	74.60
1	CR.2	Experience	0	0	0	0	0	0	8	12	8	8.00	88.89
11	CR.3	Exp. In Geographical location	0	0	3	0	12	4	4	4	0	5.67	62.96
9	CR.4	Economical Constraints	0	0	4	4	0	4	8	4	4	6.29	69.84
12	CR.5	Firm Capacity	0	0	8	0	4	8	4	4	0	5.43	60.32
10	CR.6	Firm Organization	0	0	4	4	4	0	8	8	0	6.00	66.67
13	CR.7	Head Office Location	0	0	12	0	4	4	4	0	4	5.14	52.69
6	CR.8	Past Performance	0	0	0	0	12	0	0	12	4	6.86	85.71
8	CR.9	Project Management Capability	0	0	0	4	4	4	4	9	3	6.68	74.21
3	CR.10	Quality Performance	0	0	0	0	4	1	0	12	11	7.89	87.70
2	CR.11	References	0	0	0	0	0	1	4	19	4	7.93	88.10
4	CR.12	Staff & Qualification	0	0	0	0	0	4	4	12	8	7.86	87.30
5	CR.13	Quality Control	0	0	0	0	0	0	12	9	7	7.82	86.90

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Major Findings

As a result of the interviews conducted and the data about the A/E pre-qualification and selection process in Saudi Arabia were analyzed, the following were noted:

1. The current A/E pre-qualification and selection methods are inconsistent, insufficiently adequate for identifying proper selection criteria for proper crucial evaluation and selection.
2. In Saudi Arabia, the major selection criteria were identified and ranked by the public sector as follows:
    - Staff & Qualifications.
    - Experience.
    - Quality Performance.
    - Project Management Capability.
    - Past Performance.
    - Quality Control.
    - References.
    - Current Work Load.
    - Firm Organization.
    - Firm Capacity.
    - Economical Constraints.
    - Experience in Geographical area.
    - Head Office location.

3. The data analysis indicated a strong agreement between the public sector and consultants in ranking the major selection criteria. However, the small difference in ranking of the criteria is due to the different levels of experience of the respondents.
4. The *Staff and Qualifications* criteria are ranked first. This is due to the fact that public sector considers it is the most important criteria that must

be evaluated for proper and successful selection and for positive indication that might be realized for the A/E.

5. The public sector ranked *References* seventh among the thirteen selection criteria. They believe that the consultants' references data are not fully updated, and outdated information is usually included.
6. The Saudi public sector organizes extremely believe that *Economic Constraints, Experience in Geographical Area* and *Head Office Location* are not applicable criteria in the A/E selection process.
7. The recommended criteria of the research are:
    - Work Experience.
    - Quality Performance.
    - Staff & Qualifications.
    - Project Management Capability.
    - Past Performance.
    - Quality Control.
    - References.
    - and Firm Capacity.
8. The *Work Experience* and *Project Management Capability* weigh 40% of the total weight of the selection criteria. This is due to the fact that they are major factors that play a major role in the improvement of consultancy practice and the success of any project and cannot be overlooked by the A/E selection committee.

5.2 Conclusions

The major objectives of the research "*Identifying the Major selection Criteria*" and "*Development of an A/E Consultant Conceptual Selection Model CCSM*" were accomplished. The CCSM model was implemented for solving the complicated selection problem, in a practical way by comparing prospective A/Es in terms of selection criteria. The CCSM's concept is concerned with selecting a capable and competent A/E based on qualification and previous work experience to accomplish special professional service within a given time frame and with the required quality. The implementation proved that the CCSM model is a

consistent, practical and effective selection tool for selecting a qualified A/E. The CCSM is flexible enough to meet the public sector demand for accommodating additional criteria as needed.

5.3 Recommendations

Saudi public sector organizations are recommended to use the CCSM model for the following reasons:

- The model can represent a standard method *Unified Framework* that can maximize the usage and the experience among the public sector organizations.
- The model ensures fast but accurate evaluation and successful A/E selection.
- The flexibility of the model enables the user to modify it as required and while retaining a firm grip on the quality of the selection.
- It can be used in the evaluation and selection of the best technical proposals for professional services.
- It can handle single as well as group judgments, making it easy to consider the judgments' of different levels of management.

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Presented to
Dr. Sadi Assaf

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