

Improving the Saudi Arabia Procurement System:
Perception and Development of the Construction Industry

By

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ABSTRACT

The current Saudi Arabian (SA) procurement system leads to many losses in money and benefits in projects. Also, the use of the traditional procurement system in SA has been identified as one of the causes for poor performance in the delivery of construction and the major risk to the SA government. A questionnaire has been developed and carefully designed based on literature review. The purpose of the survey was to identify the validity of the recent claims that the procurement system in SA is broken and to improve the current SA procurement system. The questionnaire was sent out to 1,396 participants including 867 engineers, 256 consultants, 93 contractors, 35 owners and 132 architects and 13 academics.

All participants have been registered and licensed professionals at the SA Council for professional engineers, who work in both private and public sectors. The participants are interested in the SA procurement and contracts system with experience ranging from one to more than twenty-five years with the majority of twenty-five years of experience in common construction sectors such as; residential and commercial buildings, healthcare buildings, industrial building and heavy civil construction.

Most of the participants from both private and public sectors agreed with the survey questions subject matter regarding: zone price proposals, contractors' evaluation, risks, planning, projects' scope, owners concern and weekly risks reports (WRR). The survey results showed that the procurement system is the major risk to projects, affects construction projects negatively and is in need of improvement.

Based on the survey and literature review, a model, called Saudi government performance procurement model (SGPPM), has been developed in which the most expert contractor is chosen through four phases: submittals& education, vendors selection, illustration and execution. The resulting model is easy to implement by SA government and does not require special skills or backgrounds.

ACKNOWLEDGMENTS

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Chapter 1

INTERDICTION

The Kingdom of SA has had a major change in its construction industry in recent decades. This growth came from the continued economic development of SA (Kacst, 2011). Also, the country has received one of the largest and most important construction industry markets in the Middle East region. This country is going to lead much of the expansion in the region in coming years (World Construction, 2012).

It has been discovered that seventy percent (70%) of the total delays in the projects that run by the Ministry of Housing and Public Works in SA were delayed (Zain Al-Abedien, 1983). Al-Sultan (1987) has received a similar percentage of project delays and found that seventy percent (70%) of the government projects had time-overrun issues.

Al-Ghafly (1995) has done a survey to define the frequency and degree of construction projects delays by collecting data through the projects' parties such as owners, contractors and consultants. The contractors think that around thirty-seven percent (37%) of the projects have been delayed, and consultants think that eighty-four percent (84%) of the projects had some delays. The time overrun is approximately thirty-nine percent (39%) over the project's time Al-Ghafly (1995).

Al Turkey (2011) conducted a questionnaire surveying around 300 project managers who work at different sectors. The questionnaire objective was to address the implementation problems that are related to ventures in SA. Some of the results found

that eighty percent (80%) of the ventures were subject to overrun costs, and ninety- seven percent (97%) did not follow the original scheduling time.

Another study has conducted to find the reasons that cause delays in projects and identified 63 factors that have impacts on projects and classified them to four different categories based on the source. One of the most important results found were that the most factors affecting a project negatively was from the clients (Albogamy et al., 2012).

A study conducted a survey in SA to identify the factors that cause delays on projects and found that the most important factor related to clients is the lack of finance to complete projects, clients' inability to pay contractors as well as payments delays (A. Al-kharashi and M. Skitmore, 2008). Assaf and Al-Hejji, (2006) have measured the project's performance in SA. The projects suffer from delays, and the percentage of delays is 10%-30% of the original scheduling time.

A study proposed a solution to develop Saudi Arabia's procurement system by analyzing the current procurement system and conducting a survey regarding the selected contractors' impacts, selection depending on low bid, identify risks, having plans, review the scope of projects and resolve all owners' concerns before a contract is signed (A. Alofi, 2015).

T. Alhazmi and R. McCaffer (2000), in general, have found some difficulties in most studies that provide models for procurement systems, and they are the following:

- There are several significant factors in the selection phase that did not take into account all procurement systems
- Owners cannot use some procurement systems because they are difficult to implement
- Some of them require advanced mathematical methods that may hinder the use by the owners
- Some of the models are primitive in the section phase and have lack of standards in some options that must be considered.
- There are few options in the model numbers in the database

Safaa (2014) in its report in collaboration with McKinsey Company to develop the Saudi procurement system and propos some modifications to increase transparency in both the system of competitions and government procurement and the executive regulations for competition and government procurement. Safaa (2014) have created some problems related to the procurement system in Saudi Arabia as follows:

- Specifying specific specifications may be appropriate for certain producers
- There are no fixed criteria for selection
- There are some problems in advertising and competition results
- Competitors cannot enter the competition electronically
- The selection committee does not justify its recommendations

- There is no official place for complaining

Moreover, Safaa (2014) found some issues regard to the execution of projects such as; competitors cannot get the justification for not winning and non-transparent advertising results. Also, there are some observations that are concerned with the procedures of evaluating the submitted proposals to the government, such as:

- Lack of clear and detailed evaluation criteria
- Dealing with competitors in person and not informing everyone else
- There is no separate committee to make a final decision to choose the best competitor.

Alshahran & AlSaleem (2016) in their book, *Government Competitions*, which explains the Saudi procurement system and its executive regulations in order to provide positive and negative criticism about the Saudi procurement system. Also, this book has opportunities to develop the system to meet the requirements of the future development and facilitate understanding of the Saudi procurement system. Alshahran & AlSaleem (2016) found several disadvantages points related to the Saudi procurement system and its executive regulations, which are as follows:

- When the funds are approved by the Ministry of Finance to start the projects, the approved amounts may change every year.
- In some cases, the government of Saudi Arabia does not take into consideration the accuracy of the first estimating cost of the project.

- In some cases, some project items may be canceled or degraded by the government, which may cause losses to competitors

A survey was conducted and sent to the professionals who work in the public sector and have an interest in procurement and contract system in Saudi Arabia. Depending on the survey, a new phase has been added called clarification into current procurement system in Saudi Arabia. By adding this new phase to the system, the outcomes of the system will be improved in the majority of projects in the Kingdom of Saudi Arabia (Alofi, 2015). Incorrect estimation, lack of experience, inadequate decisions in companies' policy are strong causes of issues of construction projects in Saudi Arabia (Al-Barak ,1993).

Chapter 2

RESEARCH PROBLEM

- The Saudi procurement system is the one of the most important issues that has negative effects on the construction industry in the Kingdom of SA. The negative effects are a result of the contractors who have been selected through the procurement system are not qualified (Assaf and Al-Hejji, 2006).
- A. Al-kharashi and M. Skitmore (2009) conducted a survey through 86 participants to find out the reasons for delay in government projects in SA and found that one of the most important reasons is the lack of qualified personnel.
- In addition, the biggest problem in the Saudi procurement system is the selection of contractors' basis on lowest price (Albogamy et al., 2012).
- Alyaum newspaper (2013) interviewed Nasser Al-Hajri, who works in the eastern region at Chamber of Commerce and is interested with the procurement system in Saudi Arabia, says that the use of the Saudi procurement system causes problems and delays in construction projects. Also, the system has never been optimized for long time.

- Safaa (2014) in its report in collaboration with McKinsey Company to study and develop the Saudi procurement system. They have found some problems with the low price proposals, some suppliers and contractors may be able to lower their bid prices to win the competition through their relationship with supervisors. Also, some competitors can lower the prices so much of their proposals to win the competition and then they will not do some elements of the projects (Safaa, 2014).

Proposal:

This research proposes that if the Saudi Arabian procurement system can be improved, it may improve the construction performance. By doing an overall development of the SA procurement and contracts system to minimize the delays and money losses in the projects. Also, the research conducting a survey upon 1396 participants about the major issues from the use of the traditional Saudi procurement system, which selects contractors based on the lowest price.

The method proposes conducting a survey of a large number of professionals to get their perception to improve the current Saudi procurement system.

The main objectives of the research are as follows:

- To conduct a survey of a large number of professional who have an interest with the SA procurement system and licensed under the Saudi council of engineers to develop the current procurement system
- To identify the perceptions of interested professionals who work in the private and public sectors in Saudi Arabia
- To prove that the system is the main reason for delays in the most of construction projects in SA
- To identify if the professionals agree with any future improvement in the system
- To propose solutions for the future development of the Saudi procurement system

- To add two different effective phases in order to increase the performance of the current Saudi procurement system
- Also, this research proposes a solution for the issues of most projects in SA

Chapter 3

METHODOLOGY

Research methodology:

Table 1. shows the methodology that has been used in this research which based on the Grounded Theory Methodology. This methodology focus to improve the Saudi Arabian procurement system through the Saudi Arabia problem which has been found in the data from field, collected from large number of professionals, and literature review.

Table 1. Grounded Theory Methodology

| | |
|------------------------|---|
| Characteristics | |
| Focus | Improve the Saudi Arabian procurement system |
| Problem | Survey generated data and literature review identify the procurement system as a dominant problem |
| Analysis unit | Data from industry professionals who are stakeholders in procurement system in SA |
| Data Collection | 1396 participants |
| Data Analysis | Analysis of survey results |
| Dissertation | Based on a proposed model and solutions |

The analysis unit in this research is the interested professionals in procurement system in Saudi Arabia, 1396 participants. The analysis that has been used in this research based on description and comparison of the data. finally, the research dissertation is based on a proposed model and potential solutions.

The research methodology proceedings are as follow:

- Identify that the most important issue of the construction industry in Saudi Arabia is the Saudi procurement system through literature reviews
- Review performance information procurement system (PIPS) delivery method and the traditional SA procurement system
- Propose hypothesis the procurement system is broken and needs to be developed
- Identify gaps in the traditional SA procurement system and propose additional criteria to improve the system
- Conduct a survey about the perceptions of the Saudi procurement system by using a sample of participants who work in the construction industry with an interest in the procurement system such as contractors, owners, consultants, engineers, architects ... etc.

- Conduct a survey among professional participants to identify their perception of the additional criteria for the proposed model
- Conduct an analysis on the data and compare results between both private and government sectors

Chapter 4

ANALYSIS OF THE CURRENT SAUDI ARABIA PROCUREMENT DELIVERY SYSTEM

The Saudi Arabian procurement system:

Safaa (2014) in its report in collaboration with McKinsey Company to study and develop the Saudi procurement system, the government procurement system was divided into two main parts: purchases through public competition and purchases excluded from public procurement, such as direct purchase from the supplier or inviting private companies to enter the competition. Most purchases made in the Saudi government are through the general competition as seen in Figure 1.

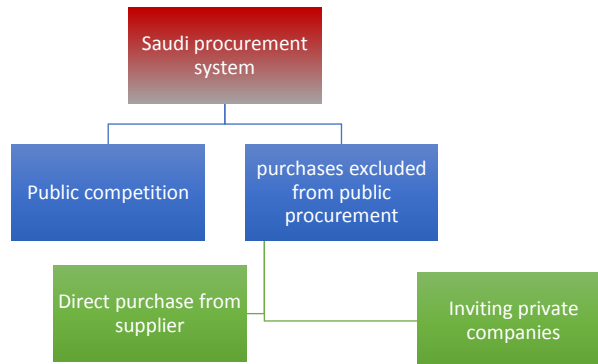


Figure 1. Saudi government procurement system

A study analyzed the current SA procurement system found out the most of the purchases go through the public competition. The Saudi procurement system consists of three main phases proposals submission, selection and proposals formulation. This system gives a contract to the contractor or vendor who has the lowest price among the contenders. The winner's prices should be within market prices and not less than 35% of the current market prices. Also, the current SA procurement system has been upgraded by proposing a new phase into current SA procurement system called clarification (Alofi, 2015).

The workflow of the Saudi Arabian procurement system:

The system of competition and government procurement in the Kingdom of Saudi Arabia issued in SEP/2006, last update, and contains eighty-one rules to organize and explain the procurement system (The system of competition and government procurement in the Kingdom of Saudi Arabia, 2006) & (Ministry of Finance in SA, 2017).

The Saudi Arabia has an executive regulation for the system of competition and government procurement issued in March/2007 (Executive Regulations for Competition and Government Procurement in the Kingdom of Saudi Arabia, 2007) & (Ministry of Finance in SA, 2017). These regulations explain how to use and implement the Saudi procurement system through twenty-two chapters.

Alshahran & AlSaleem (2016) in their book explain the workflow, step by step, of the Saudi government procurement system legally for all people who are interested in or have a work with the Saudi procurement system to maximize the benefit of this system and facilitate the use of it in all government agencies as follows:

1. The needs of the organization:

Most government projects in Saudi Arabia start with the idea and need of the organization of agency, where each governmental organization must determine its future needs based on the development plan of the organization.

After this, all these requirements must be sent to the Ministry of Finance in Saudi Arabia because to take confirmation of the necessary funds for these projects and taking prior approval from the Ministry. Then, the agency will begin to celebrate with a consultant to examine the soil, for construction projects as seen in Figure 2.

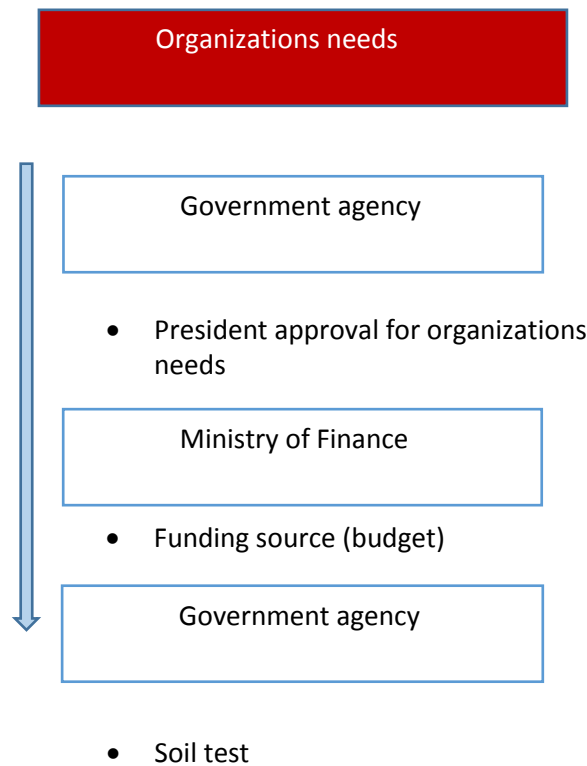


Figure 2. The needs of the organization workflow in Saudi Arabia

2. Invitation for bid (IFB):

The government agencies are required to announce a date for submitting bids in some newspapers and websites. Each advertisement contains important information concerning the specifications and conditions of the project. Also, the advertisement contains the cost of the purchase to enter the competition and general information about the project and place and time of submission of proposals. Moreover, if competitors need some additional information about the project that can be requested from the government agencies as seen in Figure 3.



Figure 3. Invitation for bid (IFB)

3. *Proposals:*

All proposals must be submitted to the government at the specified place and during the specified time of submission. All government agencies require the competitors for some documents that are important about them. Besides, the primary bonding about 1-2% of the total project cost. Also, the competitors must submit their experiences in previous projects, and some information about the staff who will be working on the project as seen in Figure 4.

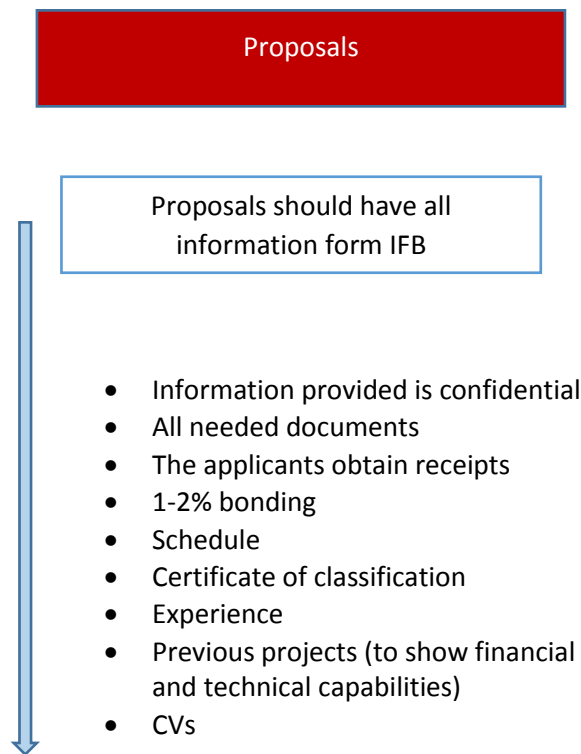


Figure 4. Proposals submission documents

4. Pre-Selection:

Before choosing one of the competitors to win the government contract, there are two committees that should recommend to choose the winner. The first committee is competent to ensure the completion of the proposals and documents required. Also, the first committee makes sure that the proposals conform to the specifications of the project and the prices of market.

All the committee's observations go to the second committee, where the second committee ensures the capabilities of financial and technical of contenders in cooperation with financial auditor and technical advisor. After that, each member of the second committee shall write his / her positive and negative feedback about the submitted proposals with recommendations of the best financially qualified proposal as seen in Figure 5.

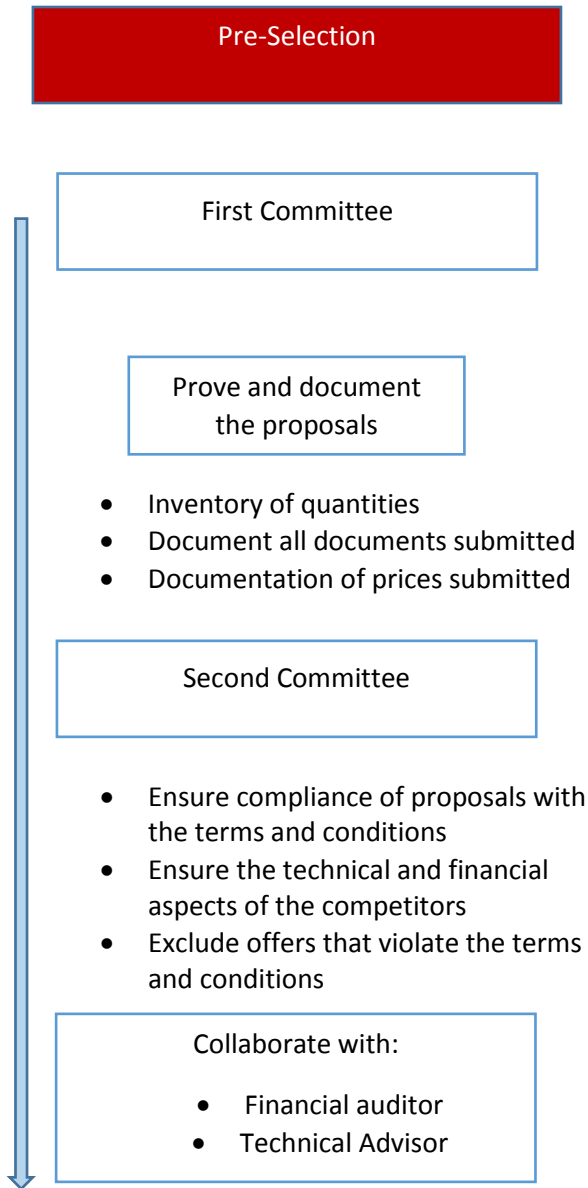


Figure 5. Pre-Selection workflow

5. Selection:

Each member of the second committee gives recommendations to choose the best competitor, where the choice of the best competitor based on the fair prices, the completeness of the proposals and the inclusion of specifications and conditions of the projects and technical and financial capabilities of the competitor as seen in Figure 6.

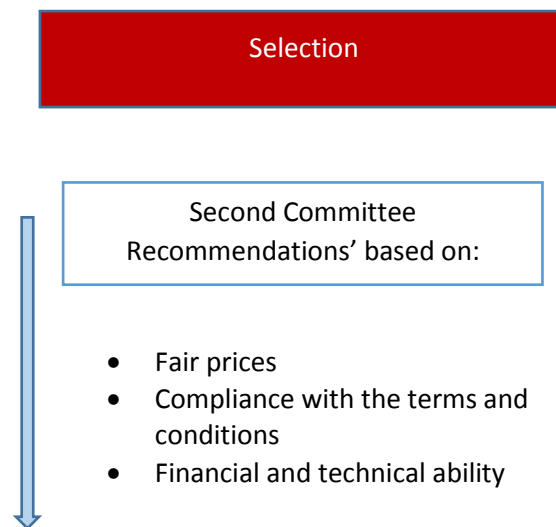


Figure 6. Selection workflow

6. Announcement of the selected general contractor/ vendor:

Based on the recommendations of the committee for the selected competitor, who have the best proposal of the technical and financial aspects comparing with the contestants, the final approval must be taken from the decision maker, the director of the government agency, to decide on the selection of the most appropriate contender based on the results of the recommendations of the second committee.

After that, the primary bonding, 1-2% of the total cost of the project, must be returned to the non-selected competitors. Now, the selected contestant is officially chosen to win the contract with government. Also, the selected contender must provide a final bonding of 5% of the total project cost to the government agency as seen in Figure 7.

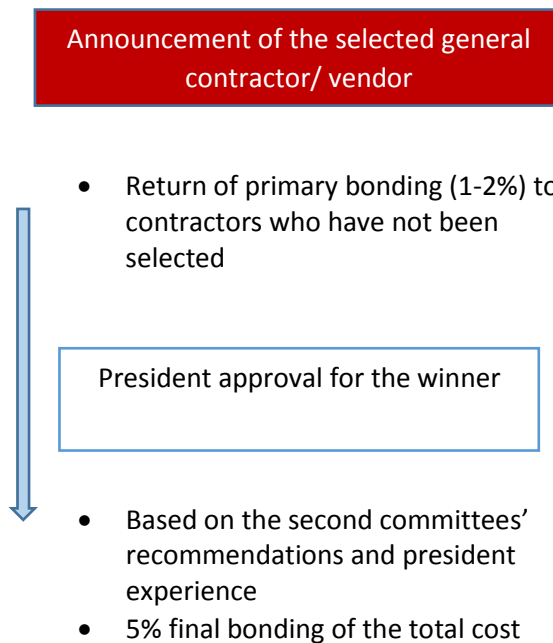


Figure 7. Announcement of the selected general contractor/ vendor

7. Signing contracts:

The selected competitor must sign the contract with the government agency immediately, after agreeing on the amount and policy of insurance, payments and the tasks that will be performed by the contender for the government. Also, the government should use the standard contract forms that at the Ministry of Finance in Saudi Arabia. Any contracts with a value of more than five million Saudi riyals require accreditation from the Saudi Ministry of Finance as seen in Figure 8.

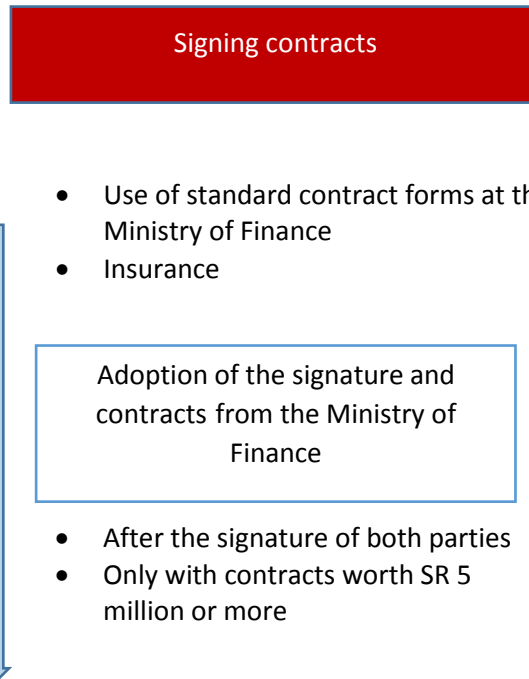


Figure 8. Signing contracts workflow

8. Execution & Supervision:

The selected competitor can start working on the site within 60 days from the date of signing the contracts, for construction contracts. In continuous contracts, operating and maintenance contracts, the work can be received before the end of the current contract. Government agencies require the competitor periodic reports to monitor and give some information to the government about work status. Usually, these reports are studied and given some observations to the competitor. The chosen contender should also take care of the observations of the government and make sure to do them immediately as seen in Figure 9.

Execution & Supervision

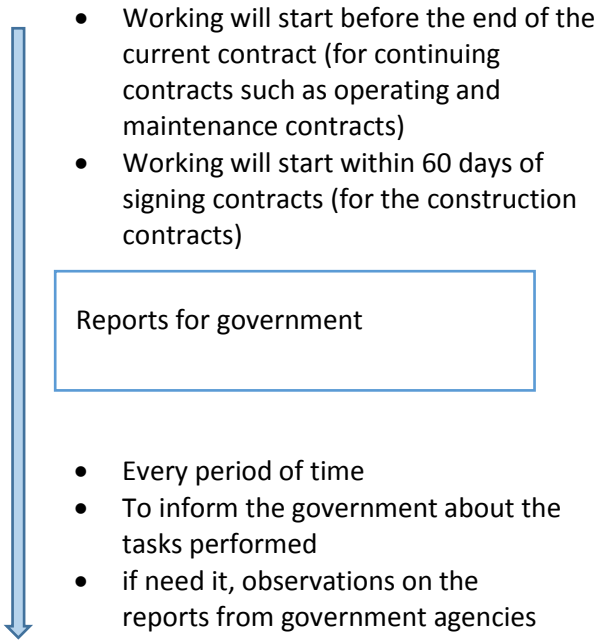


Figure 9. Execution and Supervision workflow

9. Delivery of completed works and guarantees:

After completion of all the tasks that are in the signed contract that is between the selected contender and the government, all works, buildings, supplies or services shall be delivered to the government authorities with a guarantee for a period of one year, for all maintenance contracts. And ten years for buildings and construction works. The final delivery begins after the completion of the primary delivery. During the final delivery, the selected contestant must submit all drawings, documents and maps of the buildings and any documents that is related to the provided work or equipment to the government agency as seen in Figure 10.

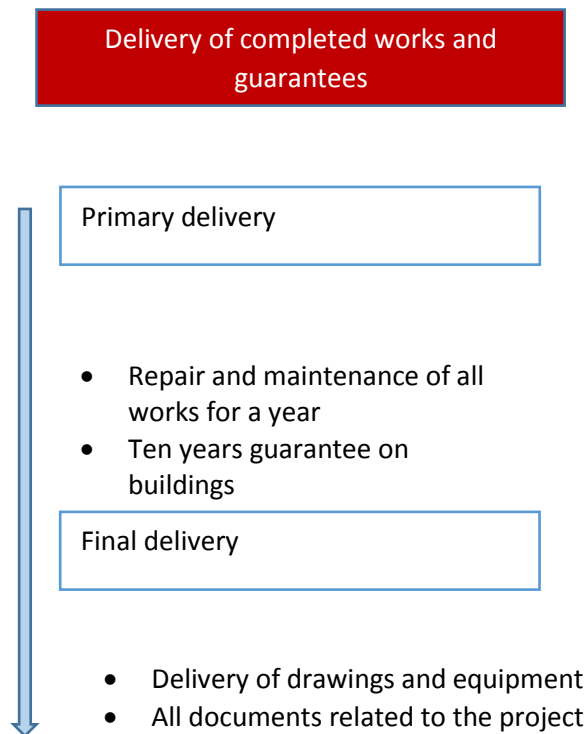


Figure 10. Delivery of completed works and guarantees

Chapter 5

BEST VALUE PERFORMANCE INFORMATION PROCUREMENT SYSTEM (PIPS)

Since 1994, Dr. Dean Kashiwagi has created a system called performance information procurement system (PIPS). PIPS was tested about 1750 times in/out the United States with around 98% users' satisfaction. Also, this system has achieved impressive results in project performance and delivery in time and budget in both construction projects and non-construction projects (PBSRG, 2016)

The PIPS concept is to optimize the selection of expert who has the enough knowledge about the project. This is the best way to make sure that the winning contender has sufficient information about the project and can handle the project in an optimal way that reduces costs, risks and increases the quality and performance of the project (Kashiwagi, 2014).

As it is seen in Figure 11, PIPS consists of three main phases; Selection, Clarification and Execution. These phases are preceded by a preliminary phase called a Pre-Qualification phase. All contestants must go through these phases to select the expert contractor/vendor (Kashiwagi, 2014).

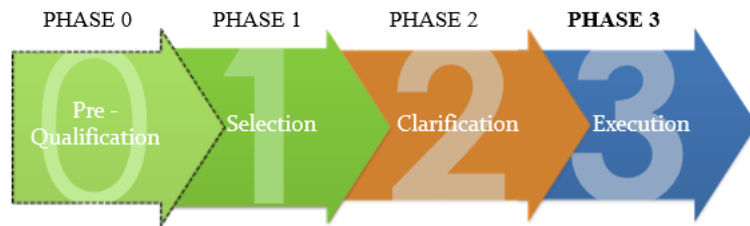


Figure 11. PIPS Phases

1. Pre-Qualification Phase:

This phase focuses on education and how the contestants will be selected. Also, the competitors in this phase must provide some important documents to the owner such as; past performance, insurance, bonding as well as some information about the financial capabilities of the competitors. In some cases, the owner may not have to start with this, pre-qualification, phase and can start from the first phase, selection phase (Kashiwagi, 2014).

2. Selection Phase:

In this phase, the expert competitor will be selected, where the expert contestant is selected based on expertise. The selection here does not be based on the lowest price or the best range and schedule of the project (Kashiwagi, 2014).

The expert contender is chosen based on five criteria: definition of project risk, adding value to project, cost and capability. This phase is made up of four filters: dominance check level, capability, prioritization and interview. After the expert contestant has been chosen, he must go through to the next phase, clarification (Kashiwagi, 2014).

3. Clarification Phase:

Now, the best competitor has been chosen. In this phase, clarification, focuses on the technical aspects of the competitor and ensure that the best competitor is technically qualified. Therefore, the contender must submit important documents such as: project schedule and milestone, project risks, risk mitigation plan, performance measurements, and weekly risk report WRR.

The purpose of this phase is to deliver an offer of the chosen competition to the owner to accept it. If the offer is not accepted, the second contender is contacted to provide his offer to the owner (Kashiwagi, 2014).

4. Execution Phase:

After accepting the offer of the chosen competitor, the contracts between the parties, the owner and the chosen competitor, will be signed. In execution phase, the contestant can start working alongside with the WRR to be submitted to the owner. These WRR are the key to increase the project performance. The objectives of WRR are to: Activate the principle of transparency, responsibility and increase the efficiency of communication between all parties (Kashiwagi, 2014).

Service Industry Structure (SIS) Model:

Figure 12 shows the service Industry Structure (SIS) Model which explains that the difference between selection method; best value, negotiation-bid, price based and unstable markets, through performance and perceived competition. In negotiation-bid, the performance is high and competition is low. The selection here based on relationships and performance. However, in price based the selection of the competitors only based on the lowest price proposals. In reliance on only price, there is no transparency and less experience resulting in management, control and direction (Kashiwagi, 2014).

PIPS relies on a principle called best value, which uses expertise. The principle of the best value is to rely on the selection of the expert competitor on performance and price. The selected competitor must submit the project schedule, risk mitigation plan and quality control (Kashiwagi, 2014).

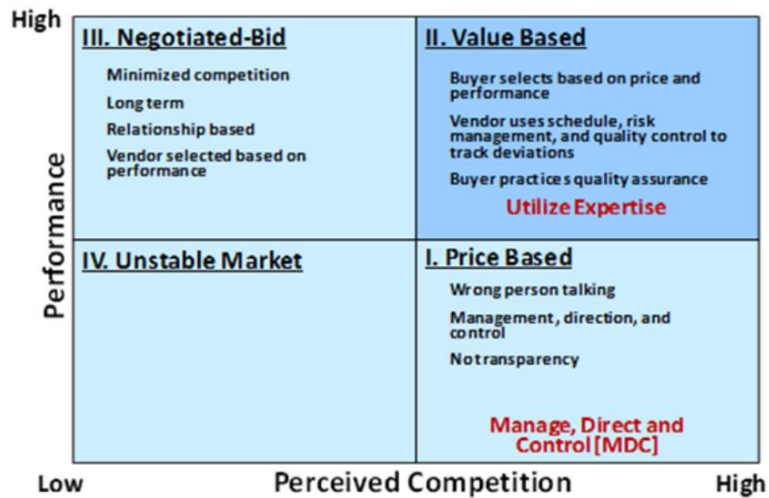


Figure 12. SIS Model

Chapter 6

PERCEPTION SURVEY

Survey Design:

The survey was carefully designed in order to get the participant's perceptions over the system of contractors' selection, the impact of the procurement system on the projects, and the impact of contractors who have been selected by the SA procurement system on projects. Also, the survey has been collected in order to identify the perceptions and satisfaction of participants who work in the construction industry in both the private and governmental sectors with the current Saudi Arabian procurement system.

Survey question subject matter:

- Selected contractors' impacts
 - The current system performance
 - Market & proposals prices
 - Differences in proposals prices
 - Traditional (SP) selection system criteria's impacts
 - Change needs
 - Participants' satisfaction

The Professionals were able to answer the questions by using two different scales:

1. I Strongly Agree; I Agree; I Don't know; I Disagree; I Strongly Disagree.
2. Yes; I am not sure; No.

Method:

The survey has been sent to the participants who have been licensed by the government engineering professional group in SA through using the organization access. Moreover, the data was collected through 1396 participants out of 12683 participants who are interested with the procurement system and contracts in Saudi Arabia. This is including 867 engineers, 256 consultants, 121 contractors, 35 owners and 132 architects and 13 academics. All the participants of the private and government sectors have experience between less than a year and more than 25 years in different types of construction areas such as residential and commercial buildings, healthcare buildings, industrial building and heavy civil construction.

Results:

The survey questions were designed carefully to identify the real perceptions of the participants regarding the Saudi Arabian procurement system. Some participants did not answer some survey questions, either for lack of their knowledge or for other specific reasons. Therefore, it has been considered only in those who have enough knowledge of the survey questions.

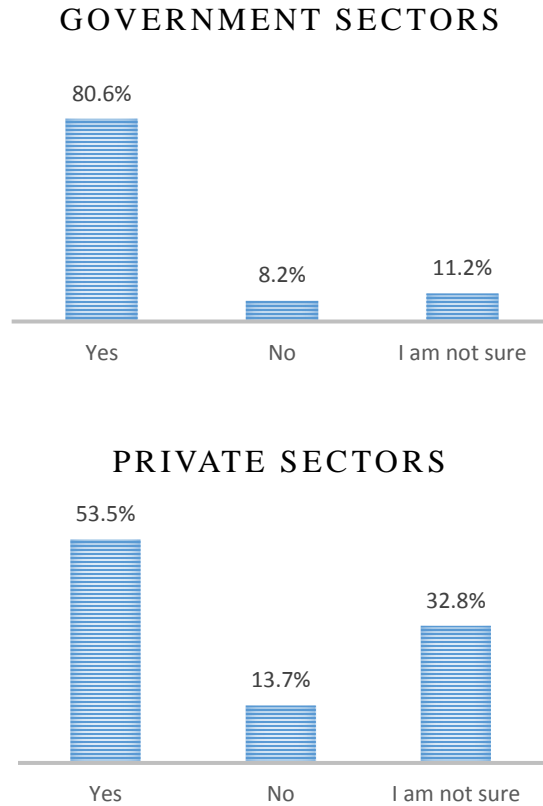


Figure 13. The procurement system chooses non expert contractors

A survey conducted and was sent to the licensed professionals who work in the governmental sector and have an interest in procurement and contract system in Saudi Arabia. This survey regarding the selected contractors' impacts on the projects, selection depending on low bid, identify risks, having plans, review the scope of projects and resolve all owners' concerns before a contract is signed (Alofi, 2015). The data in the study have been used to make comparisons with the private sectors in this research for both perception and improvement. Around fifty-four percent (53.51%) of the participants who work in private sectors think that the procurement system in Saudi Arabia chooses non expert contractors as seen in Figure 13.

Around eighty-one percent (80.61%) of them who work in government sectors think that the contractors who has been chosen in Saudi Arabia are not experts as seen in Figure 13. As seen in figure 14, approximately seventy-three percent (73.41%) of the private participants think that the traditional Saudi procurement system leads to project delays and increased costs. Eighty-six percent (86.39%) of governmental participants agree with the question.

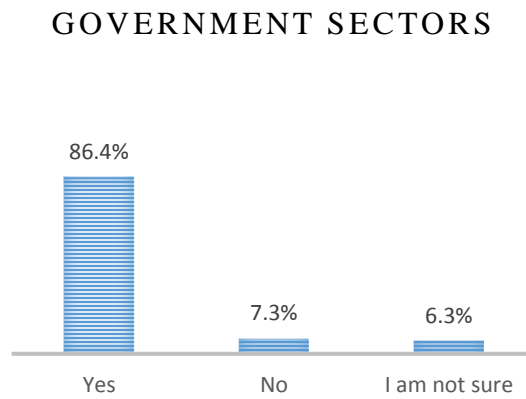
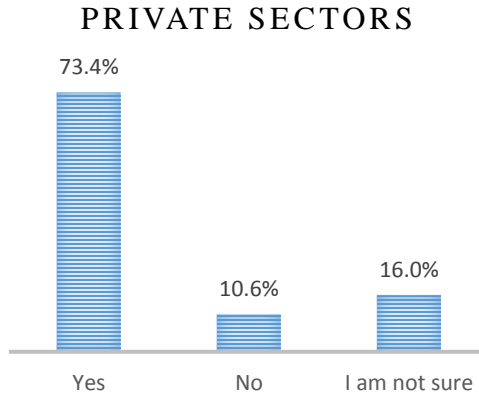


Figure 14. Traditional Saudi procurement system leads to project delays and increased cost

Around seventy-two percent of the participants who work in private and government sectors agree that there is a large difference between market prices and the lowest proposal price (35% less than market prices) thus maximizing losses in time and money, while only around eight percent (8%) of them disagree with it as is shown in figure 15. In addition, from the governmental participants, there are approximately ninety-four percent (94.1%), and eighty-eight (88.5%) from private sectors who think that

the contractors who have very low and high prices affect the project negatively in Saudi Arabia as is seen in figure 16.

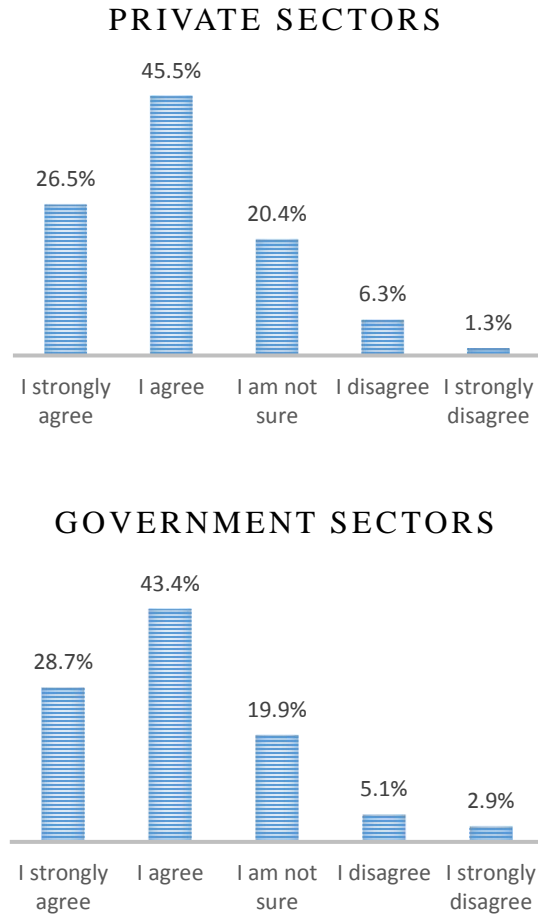
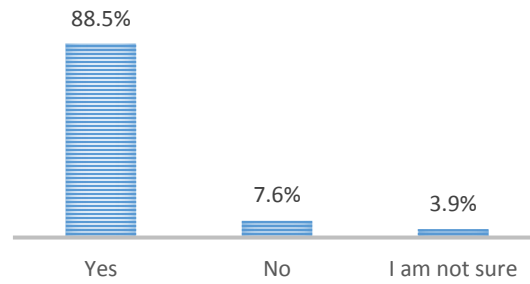


Figure 15. difference between market prices and the lowest proposal price leads losses in time and money.

PRIVATE SECTORS



GOVERNMENT SECTORS

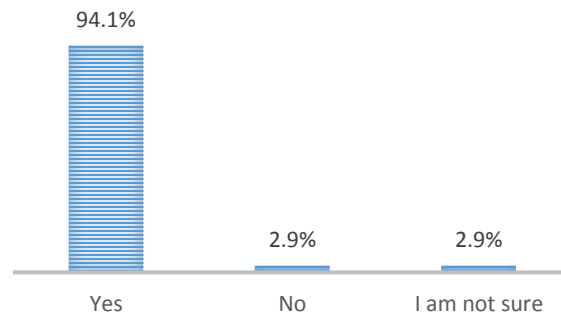


Figure 16. The contractors who have very low and high proposals, affect the project negatively in Saudi Arabia.

Figure 17 shows that around ninety-three percent (93.4%) of the participants who work in government sectors think that the contractors' selection depending on low bid has a negative impact on construction projects. Ninety-six percent (96%) of them who work in private sectors think that the Saudi Arabia projects has negative impacts due to the method of selection of contractors.

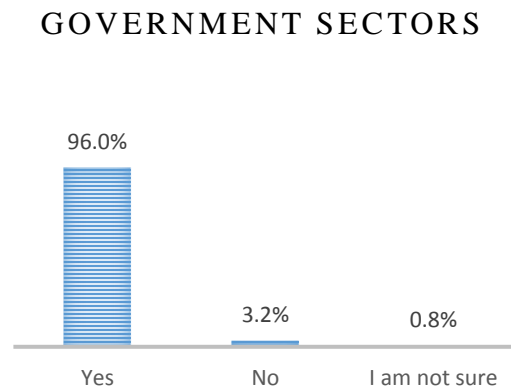
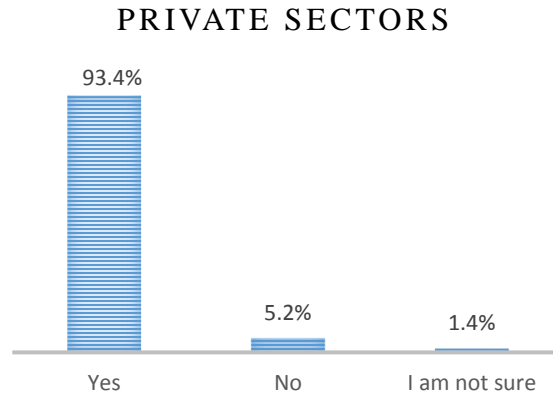


Figure 17. Contractors selection depending on low bid has a negative impact on construction projects.

Moreover, about ninety-six percent (96.2%) of participants of government sectors, and around eighty-eight percent (87.8%) of participants of private sectors feel that there needs to be a change in the traditional Saudi procurement system as is seen in figure 18. The participants' satisfaction from private sectors with the traditional Saudi procurement system is 5.03 out of 10, while the satisfaction of governmental participants is 4.21 out of 10 as seen in the Figure 19.

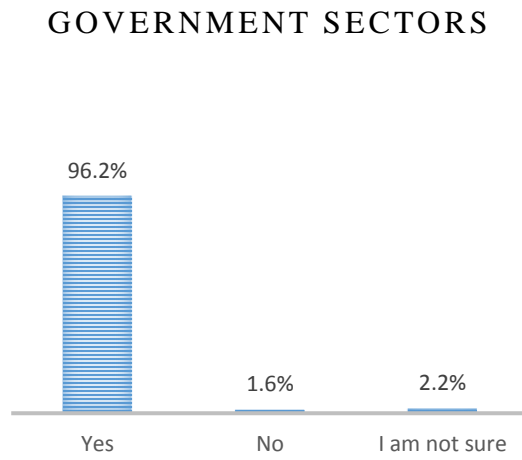
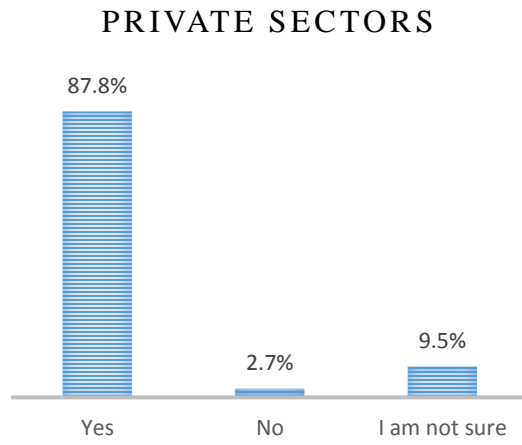
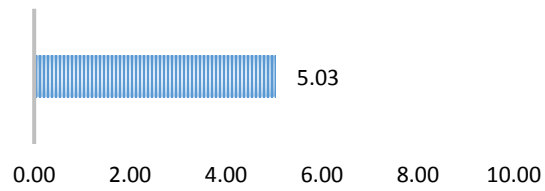


Figure 18. Participants feel that there needs to be a change in the traditional Saudi procurement system.

PRIVATE SECTORS



GOVERNMENT SECTORS

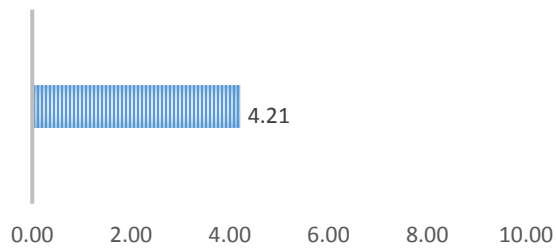


Figure 19. The participant's satisfaction with the traditional Saudi procurement system, (1-10) 10 is the best.

Participants' Perceptions in different type of projects with 25/ more years of experience:

Table 2 shows the percentage of agreement of the participants who work in the private sector about the following statements: the system chooses non-expert contractors and leads to delays, low-bid method negatively affects projects, very expensive and cheap proposal negatively affect projects, the participants feeling and satisfaction with current SA procurement system.

The table 2 shows the data depending on 25 years of experience or more with different types of projects such as residential buildings, commercial buildings, healthcare construction, industrial construction and heavy civil construction. Moreover, as shown, the ratios that have been obtained are convergent between the different types of projects. More than 80% of respondents agreed with the statements and about 60% of them agreed that the system selects unqualified contractors.

A slight difference in the results of the participants who work in heavy civil construction, about 78% of them believe that the SA procurement system leads to delays at projects and around 76% of the them believe that the low-bid influences negatively on the projects. In addition, 56% of the participants in heavy civil construction believe that the system selects unqualified contractors.

Table 2. The Perceptions of the participants from the private sectors about the Saudi procurement system, depending on the type of project.

| Type of project | The system chooses non expert contractors | The system leads to project delays | lowest proposal definition has a negative impact | Low and high proposals has a negative effect | Low bid has a negative impact | System changing | Satisfaction |
|--------------------------|---|------------------------------------|--|--|-------------------------------|-----------------|----------------|
| Residential buildings | 60.5 % | 83% | 88.7% | 94.3% | 100% | 96% | 4.64 out of 10 |
| Commercial buildings | 61% | 84.6% | 83.7% | 93% | 100% | 100% | 4.74 out of 10 |
| Healthcare construction | 56% | 82.9% | 84.6% | 92.3% | 100% | 100% | 4.33 out of 10 |
| Industrial construction | 68% | 87.2% | 86.2% | 93% | 100% | 95.5% | 4.84 out of 10 |
| Heavy civil construction | 63% | 78.8% | 76% | 100% | 95% | 94% | 4.79 out of 10 |

In addition, as seen in table 3, the perceptions of the participants who work with government sectors are shown and have 25 years or more of experience. Almost all the participants agreed with all statements. 71.4% of participants who work at residential buildings and around 75% of them who work at commercial buildings agreed that lowest proposal definition has a negative impact on projects.

Table 3. The percentage of agreement of the participants from the governmental sectors about the Saudi procurement system, depending on the type of project

| Type of project | The system leads to project delays | lowest proposal definition has a negative impact | Low and high proposals has a negative effect | System changing | Satisfaction |
|--------------------------|------------------------------------|--|--|-----------------|----------------|
| Residential buildings | 100% | 71.4% | 100% | 100% | 3.88 out of 10 |
| Commercial buildings | 100% | 75% | 100% | 100% | 4 out of 10 |
| Healthcare construction | 100% | 100% | 100% | 100% | 3.5 out of 10 |
| Industrial construction | 100% | 100% | 100% | 100% | 3 out of 10 |
| Heavy civil construction | 100% | 100% | 100% | 100% | 4.8 out of 10 |

Analysis:

The survey results reflect the real problem emanating from the procurement system in Saudi Arabia, which was one of the main reasons for this paper. As is seen, the results are convergent between the perceptions of participants in the public and private sectors in Saudi Arabia. However, the results of the government sector reflected more positive and agree with the objectives of the research compared to those who are in the private sector.

For instance, about 89.33% of participants who work in the public sector agree that the Saudi Arabian procurement system leads to projects delays, chooses non expert contractors, affects the projects negatively in very cheap and expensive proposals and feel that there must be a change in the Saudi procurement system, compared with 75.8 % of participants in the private sectors, which is 13.53% less than public sectors.

On the other hand, only on one question (if contractor's selection depending on low bid has a negative impact on construction projects) is the result larger in the private sector by about 96% compared with the government sector, which gave a result around 93.4 %, with 2.6% difference between the two sectors.

Moreover, there is no difference in the results between the sectors concerning the difference between market prices and the lowest proposal price, which leads to losses in time and money. Also, there are about 4.8 % from the government sector and 12.6% from the private sector who are not sure about some questions, for either lack of their experience or for other specific reasons.

Chapter 7

IMPROVEMENT SURVEY

Survey design:

The survey was designed to develop the SA's current procurement system by taking perceptions of large number of participants who are interested with procurement and contracts system in SA from both public and private sectors. This development is through two essential phases, pre-construction and during construction, and the separation between the two phases is contracts signing.

Survey question subject matter:

- Zone prices
- Contractors' evaluation
- Risks
- Planning
- Projects' scope
- Owners concerns
- Weekly risks reports

The survey contained seven important questions relating SA's current procurement system and PIPS, zone price proposals, contractors' evaluation, risks, planning, projects' scope, owners concerns and weekly risks reports. The model derived from the answers of the questions can be used to radically change the current Saudi procurement system.

The participants were able to answer the questions by using two different options:

1. Yes; No.
2. I Strongly Agree; I Agree; I Strongly Disagree; I Disagree; I Do Not Know.

Methods:

The author contacted the Saudi council of engineers, an official agency in SA which is responsible to license the foreign and Saudi's engineers to practice in the construction industry to send a survey to professional engineers through the use of the agency access. All the engineers who participated in the survey have an interest in the procurement and contracts system in SA. This survey was sent to engineers who work in the private and government sectors, where both sectors follow the instructions of the current procurement and contracts system in SA.

The questionnaire was collected through a large number of participants in order to collect accurate results for their opinions. Out of 12,683 participants who received the survey, 1,396 professional engineers participated in this survey. In combination, both sectors included 867 engineers, 256 consultants, 121 contractors, 35 owners and 132 architects and 13 academics. All participants had experience between less than a year to more than twenty-five years in different areas in construction industry in SA.

Participants' Experience in different types of construction:

Table 4 shows the experiences of professional participants, who participated in the survey, in different types of construction in Saudi Arabia such as; residential and commercial buildings, healthcare buildings, industrial building and heavy civil construction. The years of experience of participants were between less than one year and more than 23 years. There is a disparity in the years of experience of participants in the survey, which gives different perceptions based on the number of years of experience.

Table 4. Participants' Experience in different types of construction

| Experience in types of construction | | | | | |
|--|------------------------------|-----------------------------|--------------------------------|--------------------------------|---------------------------------|
| Answer Options | Residential buildings | Commercial buildings | Healthcare construction | Industrial construction | Heavy civil construction |
| Less than one year | 33.71% | 32.20% | 42.05% | 35.98% | 44.70% |
| 1-3 years | 46.47% | 37.81% | 27.33% | 31.89% | 22.10% |
| 4-8 years | 51.83% | 34.93% | 26.71% | 28.54% | 16.67% |
| 9-15 years | 55.62% | 39.35% | 23.67% | 27.22% | 20.41% |
| 16-23 years | 54.84% | 47.58% | 28.23% | 40.32% | 32.26% |
| More than 23 years | 71.32% | 57.36% | 35.66% | 41.86% | 31.01% |

The participants who had more than 23 years of experience were mostly participants in the survey, specially in residential buildings, commercial buildings and industrial construction, about 71% for residential buildings, 57% for commercial buildings and 42% for industrial construction. The participants who had more than 23 years of experience gave their perceptions based on their long time of experience.

The number of participants with less than one-year experience was the lowest number than all participants, especially in residential and commercial buildings, about 34% for residential buildings and 32% for commercial buildings. The number of participants with 9-15 years of experience was the lowest in the healthcare buildings, industrial construction, about 24% for healthcare buildings and 27% for construction of factories as shown in Figure 20.

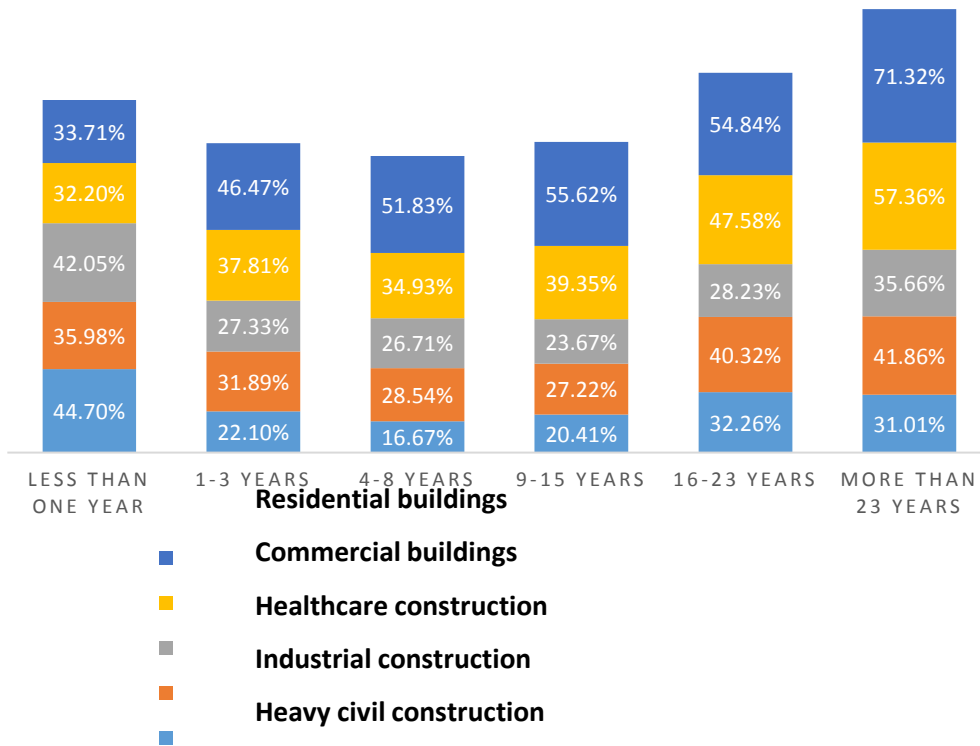


Figure 20. Participants' Experience in different types of construction

Survey results:

As seen in Figure 21, regarding the contractors' evaluation, approximately ninety-four percent (93.7%) of the participants who work in the private sectors and around ninety-six percent (96.1%) of them who work in government sectors agreed to evaluate the previous contractors' projects before the contract is signed, to ensure their efficiency for next project. Regarding the risks identification, approximately ninety percent (90.1%) of the participants who work in the private sectors consented that identifying risks before a contract is signed would improve project performance. Around eighty-nine percent (88.7%) who work in governmental sectors think that the project performance improvement will require the contractor to identify risks before a contract is signed as seen in Figure 22.

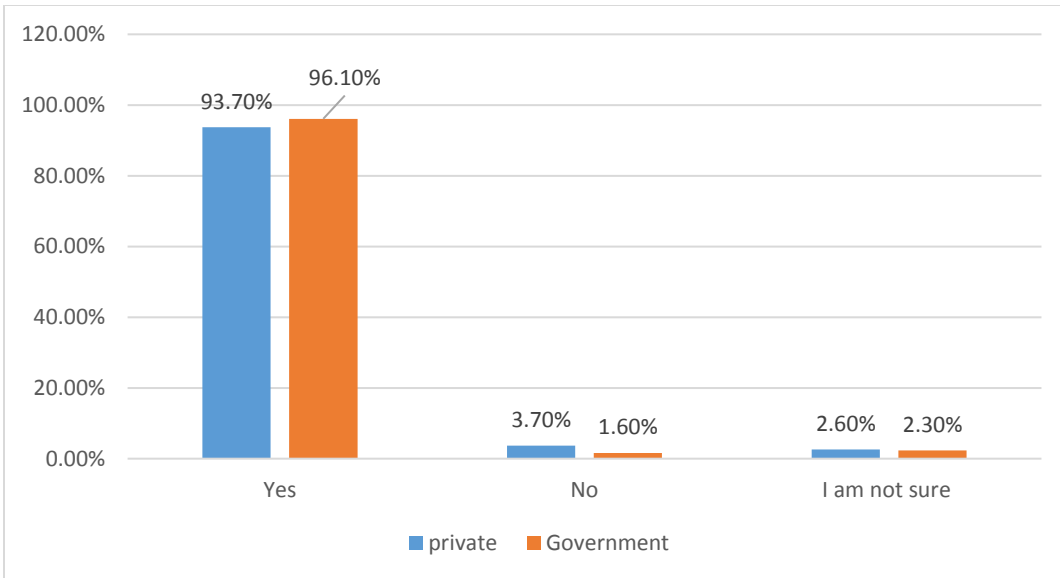


Figure 21. The evaluation of the previous contractors' projects before the contract is signed to ensure efficiency for the next project

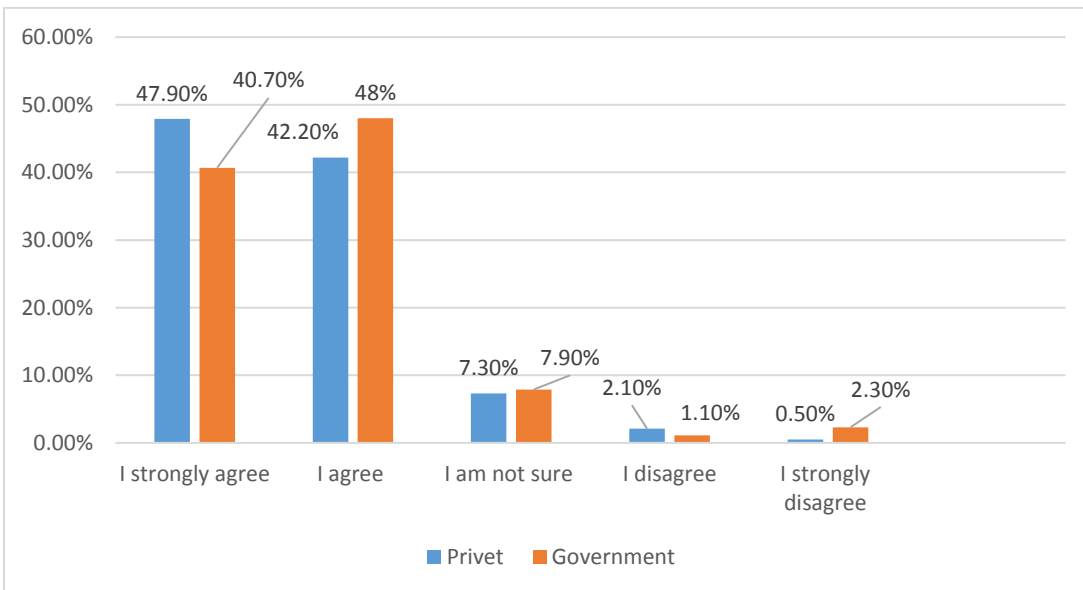


Figure 22. Requiring contractors to identify risks before a contract is signed, would improve project performance

Figure 23 shows that ninety-six percent (96%) of the participants who work in the private sectors agreed that contractors having plans before a contract is signed improves the performance of the project thus minimizing losses in time and money. Ninety-six percent (96%) from the participants who work in the public sectors agree that before a contract is signed the contractors should have plans to improve the project performance and minimize losses in money and time.

Regarding the scope of projects, around ninety-five percent (95%) of the participants who work in private sector think that requiring a contractor to review the scope of projects and verifying that they are correct improves project performance as seen in Figure 24. Around ninety-five percent (95%) of the participants who work in public sectors think that the projects performance will improve by requiring a contractor to review the scope of projects and verify they are correct as seen in Figure 24.

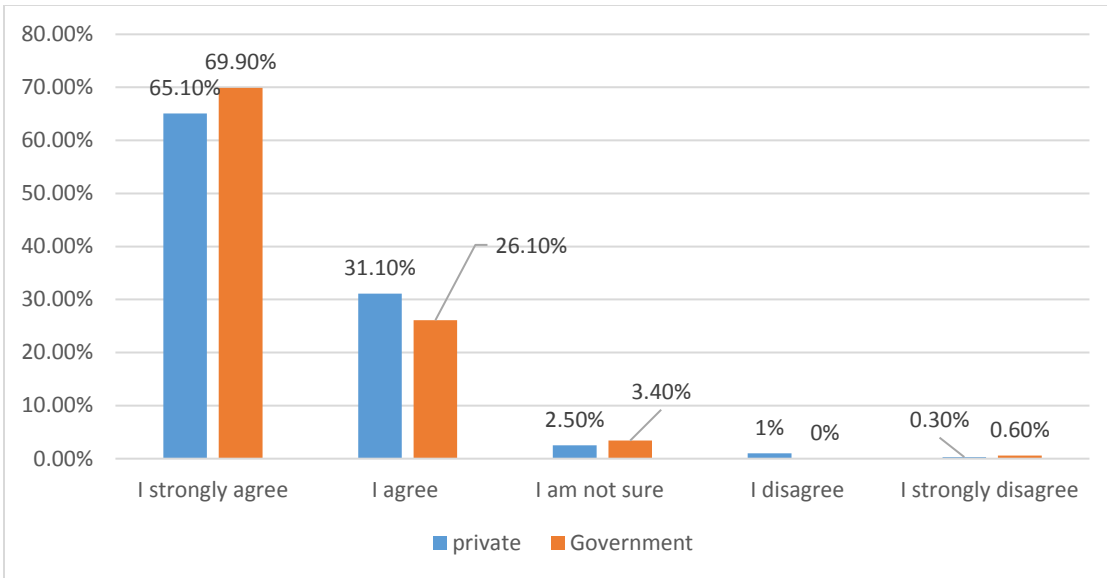


Figure 23. When contractors have a plan before a contract is signed, the performance of the project improves, thus minimizing losses in time and money

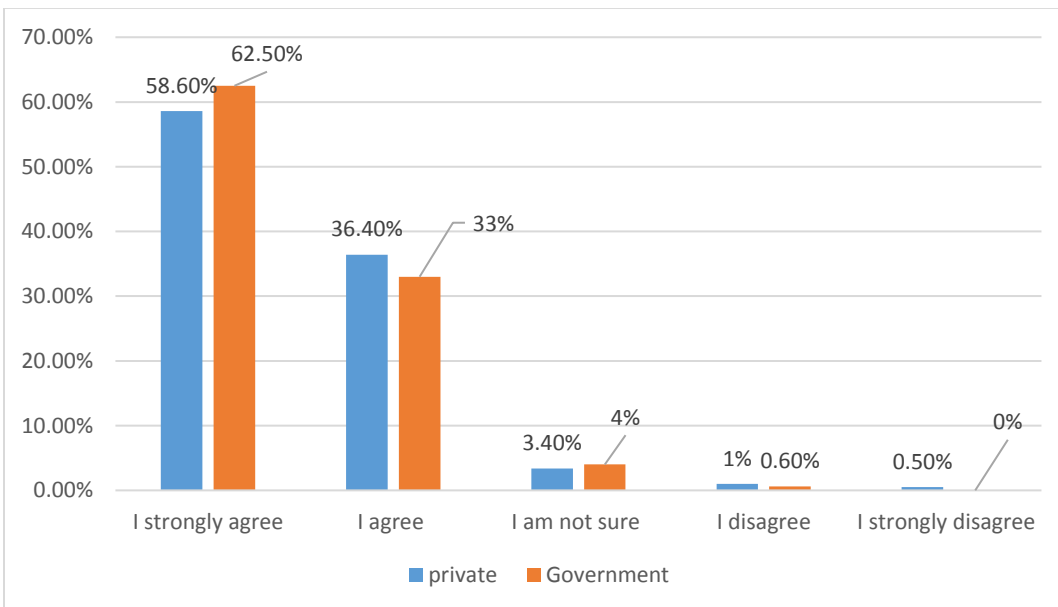


Figure 24. Requiring contractors to review the scope of projects improves projects' performance

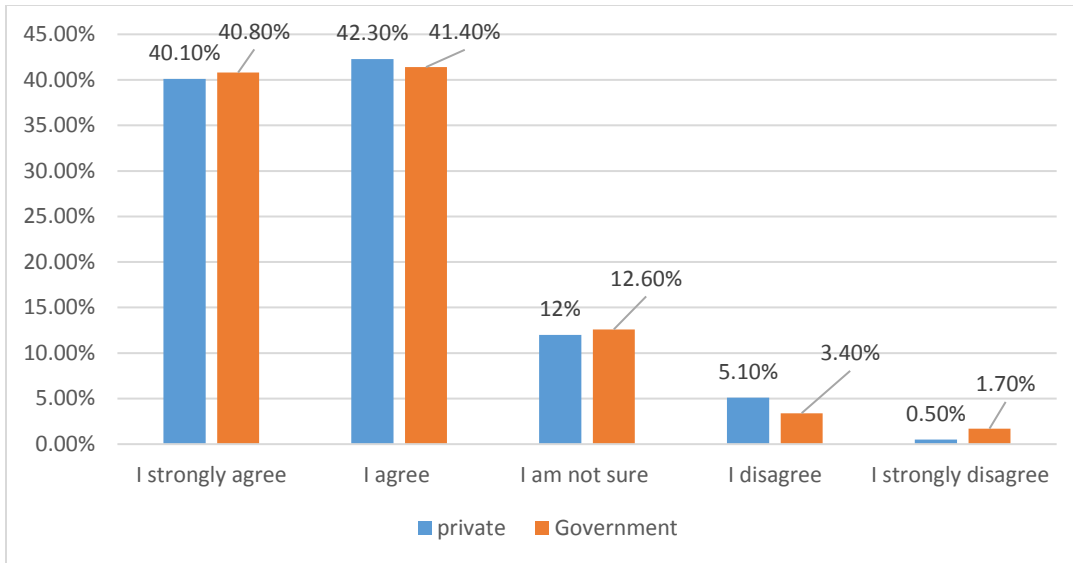


Figure 25. Requiring contractors to resolve all owner concerns before a contract is signed improves projects' performance

As seen in Figure 25, regarding the owners' concerns, approximately eighty-two percent (82%) of the participants who work in private sectors think that requiring contractors to resolve all owners' concerns before a contract is signed improves project performance. About eighty-two percent (82%) from the participants who work in public sectors think that the projects performance will improve by requiring contractors to resolve all owners' concerns before a contract is signed as seen in Figure 25.

Regarding the weekly risks reports, around ninety percent (89.7%) of the participants who work in the private sectors and approximately ninety-two percent (92.1%) from the participants who work in the public sectors support using the risks weekly reports to measure and improve projects as seen in the figure 26.

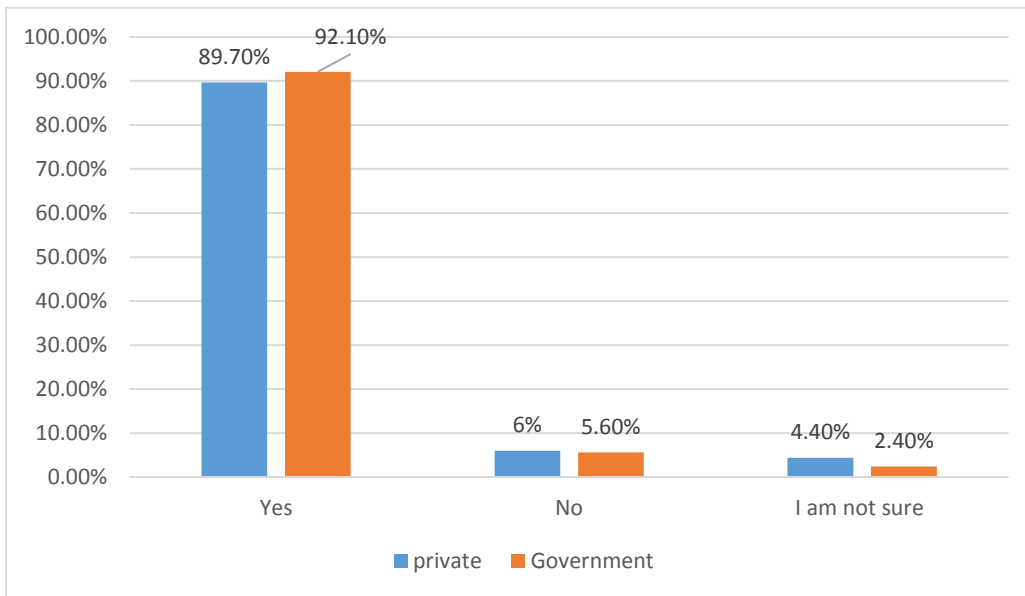


Figure 26. The weekly reports of the risks and tasks at projects would be measured and improve all project tasks

Survey analysis:

The survey was accurately designed, and the data has been collected through a large number of professionals in SA who are interested in the SA procurement and contractors' system. The results reflect the great interest of the participants, who work in both private and public sectors, in the development of the current procurement system. The results were closely matched between private and public sectors in all statements.

The participants who work in the government sectors are more willing to develop the procurement system compared with the participants who work in the private sectors through two statements: contractors' evaluation and weekly risks reports. The difference between the two sectors is about 2.4% in the both statements in favor of the public sector. This reflects many losses to existing projects caused by the current procurement system in terms of contractors' selection and currently existing standards.

Also, the participants who work in the public sector believe that the weekly risk reports (WRR) impact the projects positively. The result was very similar between the participants who work in the both public and private sectors in three statements: contractors' plans, scope of projects and owners' concerns.

However, in one result, the participants from the private sector are more willing than the public sector in terms of requiring the contractor to identify risks before a contract is signed. About ninety percent (90.1%) from the participants who work in the private sectors and around eighty-nine percent (88.7%) from public sector, which means around 2.5% present more the another sector.

Chapter 8

STANDARD DEVIATION AND STANDARD ERROR OF THE SURVEY

Figure 27 shows the standard deviation and standard error for the participants who work in the private sector in SA. Also, it shows the differences in the standard deviation and standard error between all survey statements such as; selected contractors' impacts, the current system performance, market & proposals prices, differences in proposals prices, traditional (SP) selection system criteria's impacts, change needs, participants' satisfaction, zone price proposals, contractors' evaluation, risks, planning, projects' scope, owners concern and weekly risks reports.

The standard deviation is in the range between zero to one and it found the standard deviation is partially normally distributed. The highest standard deviation is about 0.97 in the statement that says lowest proposals definition has a negative impact. The lowest standard deviation is about 0.25 in the statement that says low bid has negative impact on projects in SA as seen in the figure 27.

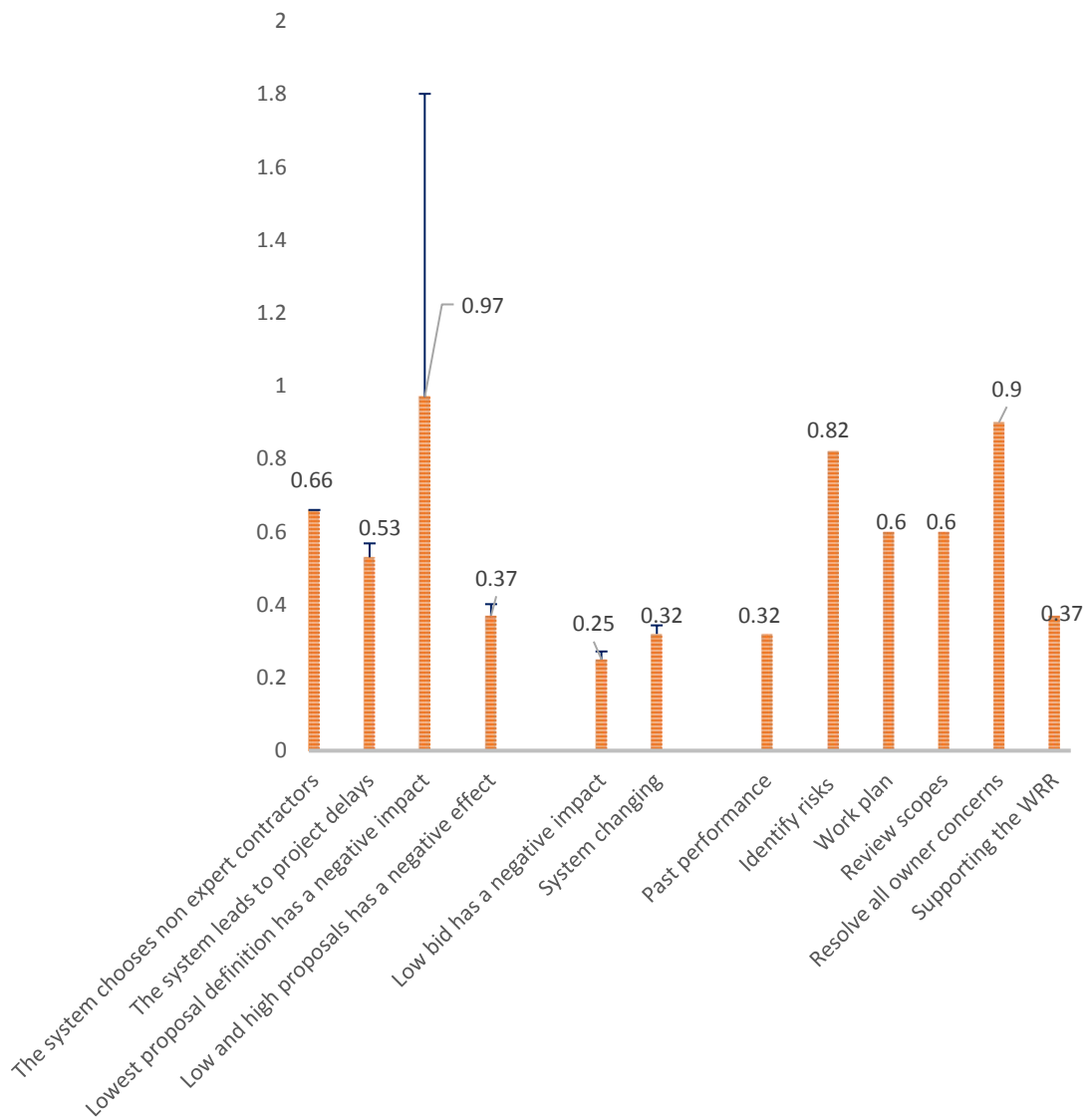


Figure 27. Standard Deviation & standard error for the participants who work in the private sector

Figure 27 shows also the standard error for respondents who work in the public sector, and it was between 0 and 0.83. The highest standard error statement is 0.83, lowest proposals definition has a negative impact. There are statements have received low standard error around Zero such as; resolve all owner concerns, past performance, identify risks, work plan, review scopes and supporting the WRR as seen in the figure 27.

Chapter 9

THE NEW COMPOSITE MODEL TO INCREASE THE PERFORMANCE OF THE SAUDI PROCUREMENT SYSTEM

The new model called SGPPM. The SGPPM is resulted from the survey and PIPS, which has been taken by professional engineers in SA and who have a long experience with the Saudi procurement and contracts system. This model is easy to use by owners or general contractors and does not require special skills or a background to implement it. The model consists of four different phases: submittals& education, vendors' selection, illustration and execution. The model allows any contractor or vendor to enter the competition without preconditions except if the government agencies require special conditions as seen in Figure 28.

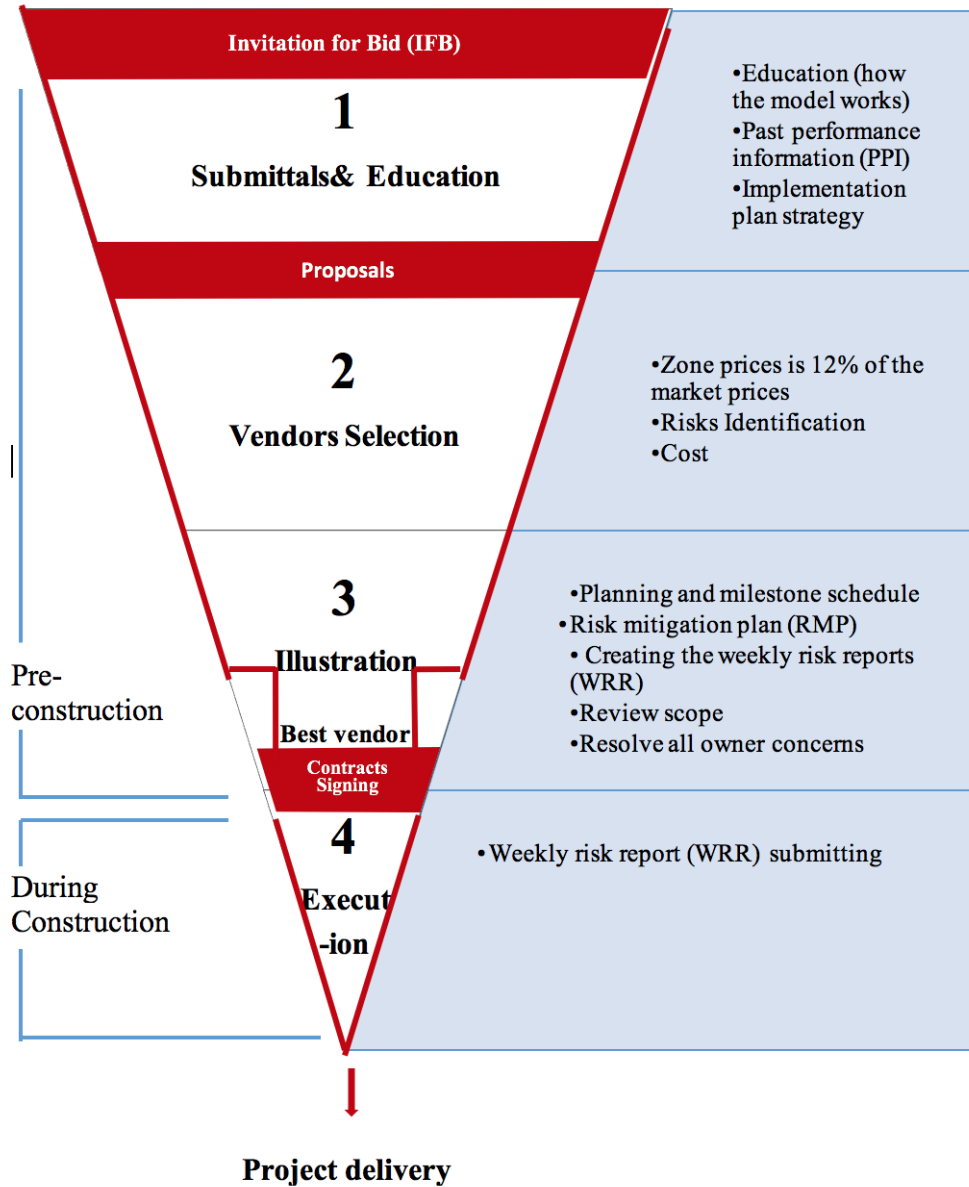


Figure 28. The SGPPM model

1. Pre-Qualification:

In this phase, contractors or vendors will be trained by the owner to educate the competitors more about how they will be chosen and more necessary information about the document submittal process in each phase. This phase is important to overcome many of the questions and observations about the projects. Also, during this phase, the contractors must submit an overall plan strategy and their past performance information (PPI) with references in order to evaluate them and give the more information to know the competitors' abilities.

2. Selection:

The selection phase focuses on the selection of the contractors or vendors within criteria such as identifying the potential risks of the project, cost and their prices in comparison to the zone prices which is 12% of the market prices, owner estimate. Also, in this phase, contractors will be chosen based on their expertise not only based on cost. The expert contractor or vendor who has been chosen in end of this phase will be moved to the next phase, clarification phase.

3. Illustration:

After having been chosen, the contractor or vendor in the selection phase, the winner, moves to the clarification phase, which is the most important phase of the proposed model because the owner will be able to ensure the qualification of the chosen contractor/ vendor. Also, in this phase, the contractor or vendor must submit the overall plan for the project and milestone schedules for each phase of the project.

Moreover, the contractor/ vendor should have an explanation on how to reduce the potential risks in the project and develop a plan to deal with those risks alongside a scope review with the owner and create the weekly risk reports (WRR). In the scope discussion, the contractor/ vendor should identify all tasks that occur in or out of the framework of the project. In addition, the contractor / seller should in this phase, find solutions to all the owner's concerns by using the principle of transparency.

4. Execution:

After signing the contract between all parties, the contractor/ vendor begins to execute the project and construction work. During this phase, the weekly risk reports (WRR) should be submitted weekly by contractor/ vendor to the owner. The WRR shows the risks that happened or will be happened to develop plans to mitigate risks before/ when they have been discovered in the project.

Chapter 10

CONCLUSION

The current SA procurement system is causing delays and money losses in previous and existing projects and suffers from several challenges and issues resulting from delays in the majority of construction projects. These issues resulted from the contractors' or vendors' selection process. Many studies have identified that the main reason for project delays is the selection of contractors who have been selected by using the Saudi Arabia's procurement system. This leads to selecting unqualified contractors/vendors because the system selects them only based on the lowest price.

On the other side, the researchers trust one of the best procurement systems in the world, which is called PIPS. The PIPS has been tested during last twenty years more than 1700 times with 98% of users' satisfaction. A questionnaire about SA procurement system improvement has been sent out to 1,396 professionals on their perceptions and satisfactions about the procurement system in Saudi Arabia to improve the system. The participants are from both the public and private sectors and have a long experience with the Saudi procurement and contracts system.

The results showed that the procurement system is broken, has negative impacts on projects in SA, and it is in need of development. The questionnaire results are as follows:

- 73.41% of the private participants and 86.39% of governmental participants think that the traditional Saudi procurement system leads to project delays and increased costs
- Around seventy-two percent from the participants who work in private and government sectors agree that there is a large difference between market prices and the lowest proposal price, thus maximizing losses in time and money, however only around eight percent from them disagree with it
- From the governmental participants, there are approximately ninety-four percent (94.1%), and eighty-eight (88.5%) from private sectors think that the contractors who have very low and high prices affect the project negatively in Saudi Arabia
- Around ninety-three percent (93.4%) of the participants who work in private sectors and ninety-six percent of them who work in government sectors think that the contractors' selection depending on low bid has a negative impact on construction projects
- About ninety-six percent (96.2%) of participants of government sectors, and around eighty-eight (87.8%) of participants of private sectors feel that there needs to be a change in the traditional Saudi procurement system

- The participants' satisfaction from private sectors with the traditional Saudi procurement system is 5.03 out of 10, while the satisfaction of governmental participants is 4.21 out of 10
- Around 94% of the participants who work in the private sectors and 96% of them who work in government sectors agreed to evaluate the previous contractors' projects before the contract is signed to ensure their efficiency for the next project
- Approximately 90% of the participants agreed that identifying risks before a contract is signed would improve project performance
- 96% of the participants who work in the private sectors agreed that contractors having plans before a contract is signed improves the performance of the project, thus minimizing losses in time and money
- Around 95% of the participants who work in private sector think that requiring contractors to review the scope of projects and verify that they are correct improves project performance
- 82% of the participants who work in private sectors think that requiring contractors to resolve all owners' concerns before a contract is signed improves project performance
- Approximately 90% of the participants who work in the private sectors and around 92% of the participants who work in the public sectors support WRR to measure and improve projects

The questionnaire contains several areas to develop and increase the performance of the Saudi procurement system by adding several new phases into the current procurement system. These new phases ensure the efficiency of contractor/ vendor who has been selected before signing the contract. Also, the new phases lead to select the most expert contractor/ vendor to maximize the success of projects. Based on the survey and literature review a model called SGPPM has been proposed to choose the most expert competitor. The SGPPM consists of four phases: submittals& education, vendors' selection, illustration and execution. These phases lead to select the expert contractor/ vendor who always increases the project success and reduces losses in time and money.

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