Prioritization of the Public Works Contract Provisions Causing Dissatisfaction to Contractors

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Abstract

The Saudi Arabia's Public Works Contract (PWC) is an old Standard Form of Contract that requires amendments. Provisions related to risk allocation, valuation of variations and other associated factors continue to cause dissatisfaction to contractors' administration of public construction contracts. This paper embarked on identifying and prioritizing the contractual provisions of the PWC that cause dissatisfaction to contractors in the administration of infrastructure projects in the Kingdom. Severity analyses of the contractual provisions reveal *site risks allocation, valuation of variations*, *subcontracting*, *security for advance payments*, and *final payment delays* as the most critical challenges. This paper provides original contribution to knowledge by establishing a methodical investigation of the shortfalls of the PWC as they affect contractors in the procurement of public infrastructure in the Kingdom. Consequently, the current shortfalls of the PWC as they affect contractors were identified and viable recommendations were pointed out. In essence, the paper presents a pioneering attempt and methodology that highlighted the weaknesses of the Public Works Contract, which is the legal framework governing the contract for engaging construction companies to perform public infrastructure works in Saudi Arabia. The paper makes pioneering attempt to draw the attention of authorities and key stakeholders concerned to urgently consider some amendments to the Public Works Contract in order to improve the shortfalls identified in this paper. This could boost the confidence of foreign contractors and attract them to invest their capital and technical expertise in the Kingdom's construction industry.

Keywords: Public Works Contract, public infrastructure, contractors, severity index analysis

1. Introduction

The Kingdom of Saudi Arabia is unarguably the leading economy in the Arabian Gulf and has the largest construction market with public and private sector projects running into billions of dollar. The main forces stimulating investments in the provision of basic social infrastructures are rapid growth in population in addition to the tremendous increase in oil revenues in the past decade (Bannan, and Elmualim, 2014). However, the award of construction contracts for public infrastructure dropped by 51% in the first quarter of 2016, signaling that the Kingdom's construction market is experiencing a difficult period as lower oil prices continue to place constraints on capital expenditure (NCB, 2016). Notwithstanding the plunge in Saudi Arabia's oil revenues, the Kingdom still has plans to implement an unprecedented scale of public infrastructure program over the coming decade to support the country's National Transformation Program i.e. Vision 2030. The plunging price of crude oil and the need to realize the visions of the National Transformation Program brought about renewed interest in Public Private Partnerships in the country. The government's acknowledging the significance of investment in public infrastructure to help its economy grow is now turning its attention to the private sector especially large construction companies to diversify its funding sources to meet the funding gap in the provision of public infrastructure. The government looks to the construction companies for mobilizing additional funding for public infrastructure projects, providing superior value for money, and enhancing quality facilities and service delivery. To this regard, there have been well-publicized massive business prospects for prospective construction companies, yet little has been discussed of the mandated Standard Form of Contract that governs all public construction works in the Kingdom.

1.1 Overview of the Saudi Arabian Public Works Contract (PWC)

In the construction market, procurement approaches are regarded as context in which construction services and facilities are acquired (Tawiah and Russell, 2008; Peter *et al.*, 2012). Selecting a suitable procurement approach to provide proficiency in the supply chain could lower public infrastructure project costs by about five percent (Gordon 1994). As the main public sector client, the Government can adopt some procurement approaches to assign contractual obligations and transfer the risks to contractors when procuring infrastructures for the general populace (Love *et al*., 2011).

The *Government Tenders and Procurement Law* (2009), which governs all public infrastructure construction projects in Saudi Arabia provides that all government bodies and agencies must use the *Public Works Contract* (PWC) to engage construction companies to perform public works. As part of control measures, the Law further provides that where the contract value of a public infrastructure project is more than SAR50 million and contract duration is more than one year, the government entity involved must first submit draft copies of the contract to the Ministry of Finance for approval before signing the contracts. The PWC comprises of two parts; 'the principal document of the contract' and 'general conditions'. The eight articles contained in the first part deal with matters that are usually specified in standard agreement of construction contracts while the sixty one articles in the second part highlights terms and conditions that are similar to those commonly found in standard general conditions of contracts. The PWC was drafted based on the 1977 FIDIC Construction Contract and has been decreed as the mandatory standard form of contract in the Kingdom since 1988.

1.2 Problem Identification

Standard forms of construction contract have been in use for long in the construction industry to stipulate and administer the rights as well as obligations of parties to a construction contract (Cheung *et al*., 2006). Over the years, the PWC has been receiving serious criticisms from construction companies due to the one-sided contractual conditions that mostly favour and protect the Employer in contracts for public infrastructure construction. The contractors contend that the PWC is an old Standard Form of Contract that requires amendments. Provisions related to risk allocation, valuation of variations and other associated factors continue to cause dissatisfaction to contractors' administration of public construction contracts. Despite the problems identified above, no published scientific research has been reported about identification and prioritization of the aspects of risk allocation and other associated factors in the PWC that cause dissatisfaction to contractors' in the administration of public construction contracts. This is considered paramount in order to enhance contract administration, satisfaction of contracting parties and improve efficiency of construction projects delivery.

As response to the highlighted problems above, this paper embarks on identifying and prioritizing the contractual provisions of the PWC that cause dissatisfaction to contractors in the administration of infrastructure projects in the Kingdom.The paper will further seek to determine the severity (through ranking) of the contractual provisions based on the extent at which they cause dissatisfaction to contractors in the administration of public infrastructure contracts.

2. The PWC provisions causing dissatisfaction to contractors

The multi-billion dollars spent by the Kingdom on public infrastructure projects over the years as well as the rapid growth in the private sector market led to a major influx of foreign construction contractors and consultants into the Saudi Arabian construction market. However, despite the huge prevailing business opportunities for the international construction companies, there have been concerns and issues about the PWC, which is the legal framework governing the contract for engaging construction companies to perform public infrastructure works in the Kingdom. To corroborate this, not long ago, the Kingdom's National Anti-Corruption Commission (Nazaha) reported that over 44% of the total government projects were hit by time overruns (Tago, 2015). The Commission attributed the project delays to poor contract documents, poor design quality and specifications, incessant issuance of change orders variations among others.

Although the Government Tenders and Procurement Law (2009) mandated the use of PWC to engage construction companies to perform public works, yet it remains an old Standard Form of Contract that requires serious amendments.

As part of the findings of this paper, the contractual provisions which are perceived to be posing problems to contractors and often lead to their poor contractual satisfaction and affect contractors' performance in administering the contracts will be analysed. The sections that follow will seek to explore some of the aspects of these provisions.

2.1 Claims

During project execution, monetary and extension of time claims could crop up from various aspects (Abdul-Malak *et al.,* 2002; Hegab and Nassar 2005; Yates and Epstein 2006). Kulalanga *et al.,* (2001) pointed out that a claim arises in procurement contract where one of the contracting parties feels that the contractual obligations and responsibilities of the other party have not been fully discharged accordingly. The PWC requires the Employer to perform the contract in good faith and in case the Employer breaches the contract, the Contractor has the right to claim for damages. However, the bone of contention for the construction companies is that the PWC stipulates that where the Contractor fails to submit his claims for damages within thirty days of the claim having arisen, the Contractor's right to compensation is inevitably relinquished!

2.2 Allocation of Site Risks

Risk allocation and sharing is a fundamental contractual control issue for construction projects that has been widely discussed in recent years in the construction industry (Hanna *et al.*, 2013). Fair and balanced allocation of risks and liabilities helps to decrease the rate of contractual disputes as well as enhances a good working relationship between contracting parties. Project owners usually take advantage of their pre-contract influence to transfer more risks and liabilities to contractors when designing construction contracts (Loosemore and McCarthy, 2008; Xu *et al*., 2010; Shumway *et al*., 2004a,b, Zhang *et al*., 2016). Such lopsided risk allocation and sharing of liabilities as pointed out by Kangari (1995) and Jin (2010) may possibly result to sharp practices on the part of the contractor by over pricing claims and lower project performance.

The allocation of site risks is indisputably one of the key contractual mechanisms that remains inconsistent with international standard forms of construction contract and affect both local and foreign contractors in the provision of social infrastructures in Saudi Arabia. The PWC provides that the Contractor is required to inspect the construction site and inform the Employer of any latent adverse physical conditions within ten days after they are discovered. To complicate issues more for the Contractor, the contract warns that the Contractor stands to lose his right to compensation that would otherwise arise if he fails to comply with this one-sided provision. Not that alone, the Contractor is also required to examine the structural and architectural designs and details, along with the soil investigations, and without any delay report to the Employer of errors in the designs or specifications and other technical errors that might affect safety.

2.3 Liability for Defects

The construction of infrastructure facilities for the public is often associated with cost and time overruns, which usually does not meet up with clients as well as end users expectations especially where defective works are observed before handover (Love *et al.*, 2011). One of the foremost shortfalls with this contractual provision is that the PWC does not specify a standard duration for the defect liability period, which is referred to as 'maintenance period' in the Contract. Usually during the maintenance period, the Contractor is obliged to remedy the listed defects as instructed by the project Engineer. However, the Engineer may well require the Contractor to find for defects at his own cost. What is more baffling is that failure to do so gives right to the Employer to bring in other contractors to do the tasks and to claim the costs of the repair works from the main Contractor. Another shortfall with this provision is that the PWC obliges the Contractor to provide guarantee for the constructed facilities against total or partial collapse or damage for ten years resulting from defects, except the contracting parties decide on a shorter duration. A quick check reveals that this practice is in line with obligations of decennial liability commonly enforced on contractors in the Middle East.

2.4 Suspension of Works

Another subjective provision of the PWC is the issue of suspension of works. The PWC provides that the Employer has right to suspend the works for an unspecified period though he will bear the resultant costs incurred except where it was stipulated in the contract or was required for carrying out the works properly due to climatic conditions, Contractor's breach of contract, or for the general safety of the works. Unfortunately, the Contractor whether local or foreign has no such express right in the PWC to suspend the works. To make matters more difficult for contractors, there is no civil code in the country. Thus, where the Employer fails to carry out his contractual obligations, there is no right to suspend the works in the Kingdom's general law.

2.5 Termination of Works

Also prominent among the grey areas of the Saudi Arabian Public Works Contract (PWC) is contract termination. It is common in most standard forms of contracts that a project owner has the right to terminate a contract prior to completion without rendering the action a breach of contract (Terrell and Surace, 2016). The PWC stipulates that the Employer may take away the contract works from the Contractor, as well as engage third party contractors to finish up the works at the expense of the main Contractor, if the Contractor bribes or tries to bribe Employer's personnel; delays the start or progress of the works; defaults in his contractual obligations and fails to remedy this upon fifteen days' notice; improperly assigns the contract or subcontracts its execution; if he is insolvent; or passes away (death). Unfortunately, just like in the case of 'Suspension of Works', the Contractor has no express contractual right to terminate the contract. Yet again, this is an aspect in which the lack of a civil code in the Kingdom bites. In the UAE for instance, the general law further complement the Standard Form of Contract by stipulating specific termination rights.

2.6 Dispute Resolution:

Disputes in construction contracts are generally unavoidable (Musonda and Muya, 2011). These disputes are costly, time consuming and often hamper the business relationship between disputing parties. The high rate of disputes especially amongst owners and contractors remains an enormous challenge bedeviling key stakeholders in the administration of construction contracts in the industry (Bayraktar *et al.*, 2012). The causes of contractual disputes in construction projects could be traced to inadequately prepared contracts, poor planning, complexity of the project site works, poor cash flow management, and ineffective communication lines amongst others (Chan *et al.*, 2006; Tanielian, 2013; Cheung and Pang 2013). Moreover, Haugen and Singh (2014) noted that even well prepared contracts do not provide guarantee that construction projects would be dispute free.

The PWC stipulates that all disputes are to be resolved by the Board of Grievances, which is part of the Kingdom's local court system. The problems associated with dispute resolution in the Board of Grievances are that their proceedings could be unequal, slow, expensive, uncertain and complicated. The PWC does not make provision for multi-tiered dispute resolution method where the Engineer's decision is followed by amicable settlement. Not that alone, the local standard form is silent about referring disputes to arbitration, adjudication, mediation and other efficient methods used for resolving construction disputes in developed countries.

2.7 Valuation of Variations

Variations remain one of the most unavoidable circumstances and common to all kinds of construction projects, which plays a key role in ascertaining the final project costs and time (Günhan *et al.*, 2007).To corroborate this, Serag, *et al.*, (2010) emphasizes that nowadays, variations in construction contracts are prevalent in nearly every construction project, usually resulting to about 5–10% rise in the original price of the contract. The fragmented nature of the industry due to involvement of various parties and stakeholders gives the industry its distinct uniqueness. The fragmented nature of the industry and poor quality control among others make it more complex and results to variations, which affect project's time and cost performance and often lead to disputes (Mohamed, unpublished data, 2001). Today, variations are fast becoming normal occurrence in construction projects. The Public Works Contract provides that the Engineer may instruct the contractor to make changes to the works. Nonetheless, the project Engineer should seek the consent of the project Employer prior to giving instructions for any change.

3. Methodology

The data for this study was obtained using survey questionnaire. The questionnaire approach is suitable for this research because questionnaires are cost effective method of data collection in a survey research as travelling to so many respondents across the Eastern Province of Saudi Arabia to obtain the respondents views would be expensive (Burton and Bartlett, 2005). Besides, it is faster to conduct survey using questionnaire approach (Mujis, 2004). In order to ensure that the respondents completed the questionnaires, the questions were made simple and short so that it was easy for the respondents to understand. The research questionnaire passed through three levels of surveys. In the first survey, the authors targeted selected respondents to identify the aspects of risk allocation and other associated factors (contractual provisions) in the PWC that continue to cause dissatisfaction to contractors' in the administration of public construction contracts. These respondents include Cost/Planning Engineers, Contract/Procurement Engineers, Project Engineers, and a selected sample of academics and researchers in the field of construction contract management. They have considerable experience that permit an understanding of construction contract management, procurement management, project management and risk management in the Saudi Arabian construction industry, which was very valuable for this research. In the second survey, the factors provided by the respondents in the first survey were collated and presented to the respondents to assess and rank the extent to which the factors cause dissatisfaction to contractors' in the administration of public construction contracts. The data obtained from the second survey were analysed and sent back to the respondents (third survey) to seek their opinion on results obtained, to which most of the respondents agree to the entire rankings obtained by them and other respondents.

3.1 Sample of the Study

Judgmental sampling was used to carefully select the contractors for the survey. Final list of 120 respondents was prepared after meticulous selection of contractors (both local and foreign) in the cities of Dammam, Khobar, Dhahran and Jubail located in the Kingdom's Eastern Province. The Province being among the top construction hubs in the Kingdom has so many on-going infrastructure projects being undertaking by many local and foreign construction companies. It was strongly assumed and believed that the participants have wider experience and are competent to provide meaningful and unbiased information. The rating scale used for the assessment of the factors in the second survey is as follows; 5 stand for very high extent; 3 for moderate extent and 1 for very low extent. In the third survey however, the respondents were requested to rate their level of agreement on the obtained prioritization of the factors on a five-point Likert scale where 1 = strongly disagree; 2 = disagree; 3 = undecided; 4 = agree and 5 = strongly agree. In many previous studies, similar scales have been adopted by various authors like Kometa *et al.*, 1994; Chan and Kumaraswamy, 1997; Tam *et al*., 2000; Odusami, 2002; Frimpong *et al.*, 2003; Zeng *et al*., 2005; Enshassi *et al*., 2010 and Sodangi *et al.*, 2014.

3.2 Method of Analysing the Factors

Severity index was used to rank the extent to which the contractual provisions of the PWC (factors) cause dissatisfaction to contractors' in the administration of public construction contracts.The analysis of severity indices is a nonparametric statistical technique commonly used by researchers in the field of engineering and technology management to examine data obtained from questionnaire respondents concerning ordinal assessment of attitudes (Bubshait and Al-Musaid, 1992; Proverbs *et al.*, 1997; Elhag and Boussabaine, 1999; Sodangi *et al.*, 2014). The analysis of severity indices uses weighted percentage scores to compare the severity of the shortfalls in the contractual provisions (factors) of the PWC under study. In this method, analysis of frequency was first done to determine the response frequency for different factors being evaluated. Subsequently, the response frequencies were used to determine severity index for every factor using the below equation:

$$S.I = \sum_{i=1}^{5} w_i * \frac{f_i}{n} * 100 \Big/ (a * 100) \quad \dots\dots (1)$$

Where: *i* is the point given to each criterion by the respondent, ranging from 1 to 5; is the weight for each point (=rating in scale of points, which "1" is the very low extent and "5" is very high extent); is the frequency of the point *i* by all respondents; *n* is the total number of responses; and *a* is the highest weight, in this study *a*=5. The five levels of extent to which factors cause dissatisfaction to contractors' are transformed to severity index values: very high (80-100%); high (70-79%); Moderate (60-69%); Low (40-59%) and very low (0-39%). This interpretation would later be used in prioritizing the severity level of the factors under the study (Chen *et al.*, 2010; Sodangi *et al.*, 2016).

3.2.1. Reliability Test

Reliability Test was run to ascertain how reliable the research method was. This was done after using the severity index torank the extent to which the contractual provisions of the PWC (factors) cause dissatisfaction to contractors' in the administration of public construction contracts.Though questionnaires are widely considered as some of the approaches used for collecting data in survey research method, they are subject to measurement errors which could be systematic or random (Cohen and Manion1994). There are several methods for calculating the reliability of measures (De Vaus, 2002). These methods comprise of the test-retest, internal consistency, parallel-forms, and panel of judges' methods among others. Yet, there is no particular method that is applicable to all situations (Sodangi *et al.*, 2014). When dealing with multi-item measures, De Vaus (2002) pointed out that the internal consistency measure is the best method to adopt as it does not encounter the problems of the test-retest method. Also, the internal consistency method enables the use of Cronbach's coefficient alpha because the strength of the coefficient gives the most thorough analysis of patterns of internal consistency by examining how groups of variables are related to groups of other variables and the coefficient does not rely on just one split-half coefficient but on all the possible combinations of splits (De Vaus, 2002). The use of Cronbach's coefficient alpha as a measure of internal consistency suggests how well the items that make up the questionnaire fit together. For instance, if a given set of items are comparatively similar, it is possible that the correlations among the items that make up the set will be high. Thus, the questionnaire that contains these items will be considered as having a high internal consistency (Pett *et al.*, 2003). The internal consistency measures indicate reliability using a coefficient ranging from 0 to 1; a higher value (0.7) of the coefficient indicates that the set of questions are highly reliable (De Vaus, 2002).

In general, this technique indicates reliability using a coefficient ranging from 0.0 to 1.0; a higher value (0.7) of the coefficient is mostly considered as being the minimum level acceptable and indicates that the set of questions are highly reliable (Dewberry, 2004). If the coefficient is less than 0.7, it signifies that the items are unlikely to be reliably measuring the same thing. George and Mallery (2003) established a generally known rule for explaining the results of this test as follows: 1.00 - 0.90 is considered outstanding; 0.79–0.70 is acceptable while 0.59–0.50 is considered poor. However, where the coefficient is obtained to be less than 0.50, it then means unacceptable reliability.

4. Analyses of Survey Results

One hundred and twenty questionnaires were distributed to experts as mentioned in Section 3.1. Forty eight questionnaires were completed, received and analyzed for this paper. A reasonable explanation on why the whole completed questionnaires were useable was because the respondents are experienced. The Forty eight questionnaires returned represent a response rate of 40%, which is considered acceptable for questionnaire survey. Like other questionnaire surveys in the field of construction engineering and management of projects undertaken by Chan and Kumaraswamy (1997) suggests that a response rate of 21% is considered adequate, Aibunu and Jagaboro (2002) suggest 30-40% while Ensahaassi *et al.*, (2010) and Sodangi *et al.*, (2014) assert that 20% response rate could be accepted when using judgmental sample for a survey questionnaire. By and large, the response rate of 40% obtained from this survey is considered to be satisfactory. Reliability test was used by the authors to rely on the responses the questionnaire items gave; erase any doubt associated with analysis based on such data, and to indicate how reliable the questionnaire for this study is.

4.1 Profile of the Respondents

In this part of the questionnaire, the questions were addressed to the respondents to obtain information on their respective profiles. Purposely, this part identifies the respondents' organizations; nature and value of projects being executed and level of experience. Most of these companies belong to the 'Grade I' category produced by the Contractors Classification Agency in the Kingdom. These companies have in the last five years, executed projects worth between SAR200 and SAR500 million as obtained from the respondents. Although focusing mainly on the contractors' responses could be argued here due to their perceived bias towards project owners and the Standard Form itself (PWC), the authors would like to infer that this paper is part of a larger study on the subject. In this paper, only results from the contractors' viewpoints were presented in order to obtain an accurate and clear picture of their perception towards some of the highlighted shortfalls in some of the contractual provisions of the PWC. It is expected that in the next article, which shall be extracted from the main study, perceptions of all the relevant key stakeholders will be duly presented. Thus, this could be accepted as parts of the limitations of this paper for now.

The sample of respondents comprise of Cost/Planning Engineers, Contract/Procurement Engineers, and Project Engineers. These set of professionals are key players in executing and managing construction contracts for construction companies. The equal proportion of these professionals (respondents) indicates that the key players in managing construction contracts are adequately represented in the survey. From the results, it is clear that the respondents have the requisite competencies to give valid and authentic response to the survey and their responses are considered vital for this survey.

From Fig. 1, it is clear that the respondents and their parent companies have been involved in building, industrial, roads and water/sewage construction projects. A closer look at the Figure would reveal that most of the respondents and their companies are involved in building construction projects followed by roads construction projects. This information captures the main image on the nature of infrastructure contracts being awarded by the government in order to boost socio-economic development in the province. Thus, the required information provided by these respondents is considered reasonably reliable and vital for this survey.

On the respondents' experience in their respective organizations, it was obtained that over 40% of them have been in their respective positions for over ten years now and 58% have spent between five and ten years in their current positions in the companies.This seems to suggest that the respondents have adequate years of experience to give necessary information in highlighting the problems associated with the contractual provisions of the PWC that influence dissatisfaction among construction contractors in the Kingdom's construction industry.

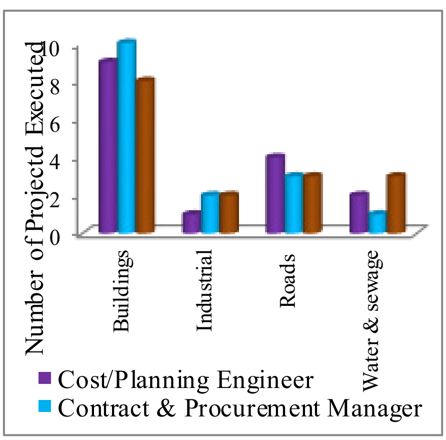

Fig. 1: Respondents' Involvement in Projects Executed by the Company

4.2 Determining Severity Index

Table 1 presents the snapshot of the severity indices and rankings for the contractual provisions of the PWC (factors) that cause dissatisfaction to contractors' in the administration of public construction contracts.

Table 1: Severity indices and rankings of factors

Factors	S.I. (%)	Rank
Site Risks Allocation	96	1
Valuation of variations	95	2
Subcontracting	93	3
Security for Advance Payments	91	4
Final Payment delays	90	5
Extension of Time & Penalties	89	6
Defects Liability	87	7
Claims Procedures	86	8
Suspension of Works	84	9
Termination of contract	83	10
Dispute Resolution	81	11

From interpretation of the severity index scale provided by Idrus *et al*., (2010), which was mentioned above, it could be easily deduced that 'high severity' index starts from 70% upwards i.e. 70-100%. From the Table 1, it is obvious that the entire contractual mechanisms evaluated by the respondents have 'very high' severity indices. The severity indices obtained, indicate the extent to which the contractual mechanisms contained in the Saudi Arabian Public Works Contract affect contractors in the procurement of public infrastructure in the Kingdom.

As expected, among the top-five most severe factors are *'site risks allocation'*(96%),*'valuation of variations'*(95%), *'subcontracting'* (93%), '*security for advance payments*' (91%), *'final payment delays'* (90%). The allocation of site risks is indisputably one of the top most rated factors that affect contractors in procuring public infrastructure in Saudi Arabia. This is not surprising since the PWC provides that the Contractor is required to inspect the construction site and inform the Employer of any latent adverse physical conditions within ten days after they are discovered. To complicate issues more for the Contractor, the contract warns that the Contractor stands to lose his right to compensation that would otherwise arise if he fails to comply with this one-sided provision. Not that alone, the Contractor is also required to examine the structural and architectural designs and details, along with the soil investigations, and without any delay report to the Employer of errors in the designs or specifications and other technical errors that might affect safety.

Variations (Change Orders) remain one of the most unavoidable circumstances and common to all kinds of construction projects, which plays a key role in ascertaining the final project costs and time (Günhan *et al*., 2007).To corroborate this, Serag, *et al*., (2010) emphasizes that nowadays, variations in construction contracts are prevalent in nearly every construction project, usually resulting to about 5–10% rise in the original price of the contract. The fragmented nature of the industry due to involvement of various parties and stakeholders gives the industry its distinct uniqueness. The fragmented nature of the industry and poor quality control among others make it more complex and results to variations, which affect project's time and cost performance and often lead to disputes. (Mohamed, unpublished data, 2001). Today, variations are fast becoming normal occurrence in construction projects.

Surprisingly, despite the high volume of on-going construction projects in Saudi Arabia and the criticality of variations in construction projects, the PWC has inadequate details for valuing variations. This is quite alarming as this could be a recipe for disputes among contracting parties and disputes have considerable impact on project completion costs and time. Thus, it is not surprising to see that the respondents rated this contractual to have the highest severity. As a matter of urgency, the relevant ministry in the Kingdom needs to do something fast about this issue so as to improve the resident foreign contractors' satisfaction level and to attract top prospective foreign contractors to the Kingdom's construction market.

The problem associated with valuation of variations (change orders) is indisputably among the top most rated contractual provisions that affect contractors in the contract administration of public infrastructure in Saudi Arabia. This is not surprising considering the fact that a Contractor who is entitled to payment for variation works can easily lose his right to payment for variation works if he simply fails to include details of his variation claims in the monthly report submitted to the Employer. The Public Works Contract provides that the Engineer may instruct the contractor to make changes to the works. Nonetheless, the project Engineer should seek the consent of the project Employer prior to giving instructions for any change. There is no single provision in the PWC which states that the Contractor may well assume that all change order instructions given by the Engineer are actually approved by the Employer. Consequently, the Contractor bears all the risks of the Engineer acting outside his powers. The PWC further provides that all change order instructions must be in writing. However, the change order must not either change the object of the contract, the contract value must not be exceeded by more than ten percent or reduced by more than twenty percent. The PWC requires the Engineer to value variations to the works by reference to any appropriate rates in the contract. If there are no relevant rates and a fair price cannot be decided, the valuation of variations should then be made by the original tender evaluation committee.

Subcontracting is another key aspect of the contractual provisions of the PWC that affect mostly foreign contractors in procuring social infrastructures for the public. As obtained in most standard forms of construction contracts, the project Contractor is usually liable for the performance of his entire Subcontractors. In spite of that, the Public Works Contract further insists that a foreign Contractor is obliged to engage local contractors for not less than thirty percent of the works unless the Ministry of Finance provides some specific exemption to the Contractor. This usually affects the performance of the foreign contractor since the choice of local subcontractors will definitely have a greater influence on the project's overall performance. Contractual issues related to subcontractors' errors in design, quality of materials or workmanship, and delays caused by subcontractors are among many other problems that could be associated with many local contractors. Besides, the safety and quality culture and the technical abilities of these subcontracting companies are not at par with their foreign counterparts and having about 30% of these local subcontractors aboard a contractor's project team could spell doom for the foreign contractor. Although there are some reputable local subcontractors around, their hands are usually full considering the high number of on-going infrastructure projects in the Kingdom. Additionally, a foreign Contractor is also required to patronize specific services of local establishments like insurance and transportation, and to generally give higher priority to local products and services.

Security for advance payments is another grey area causing serious concerns to contractors in the contract administration of infrastructure projects in the Kingdom. The PWC provides that advance payment for up to five percent of the contract value may be made to the Contractor by the Employer as long as it does not exceed SAR50 million. Surprisingly, this advance payment is made against a guarantee of the same amount of the advance payment, which is subsequently recouped from deductions from certified progress payments at the same rate! This is done in such a way that within ten days of accepting the Contractor's tender, he is required to furnish the Employer with an irrevocable bank guarantee of five percent of the contract value. This guarantee serves as a security to the Employer and must remain in place until handover stage of the project. What causes sleepless nights to contractors is that the PWC is silent on the conditions in which the guarantee can be called by the Employer. More worrisome is the fact the PWC does not specify any pre requisites to such a call being made!

Final payment delays is another factor rated by the respondents as having very high severity, which requires close attention since it affects contractors in the contract administration of public infrastructures in the Kingdom. The PWC was prepared based on estimated quantities that are subject to re-measurement by the project Engineer. As is usually the case, applications and certifications for progress payments are to be made and issued respectively every month while the Contractor is entitled to receive his payments no more than thirty days later. The main bottleneck for the Contractors with this mechanism is that the payment of the final amount due to the Contractor is delayed pending the completion of provisional acceptance of project and the issuance of certificate from Zakat & Income Tax Department. This must be done before the contract's final account settled and the performance bond returned to the Contractor upon completion of the project.

4.3. Reliability Test

The overall Cronbach's alpha for the eleven factors was obtained from the reliability analysis. The overall Cronbach's alpha of 0.92 is considered 'excellent' by George and Mallery (2003) as it indicates very strong internal consistency among the eleven items. In essence, these test results indicate that professionals (respondents) who tended to assign high points for one factor also tended to assign high points for the other factors. Likewise, respondents who assigned low points for one factor also tended to assign low points for the other factors. Therefore, knowing the points for one factor would enable accurate prediction of the points for the other factors. However, this ability to predict scores from one item (factor) would not be possible when the Cronbach's alpha is low. Given that analysing statistical data depends on measurements being both reliable and valid then the ability to obtain consistent responses makes a measurement reliable and a questionnaire item is reliable if it gives dependable and consistent responses from the respondents (De Vaus, 2002). De Vaus (2002) further emphasized that there is a need to rely on the responses that a questionnaire item gives in order to erase any doubt associated with analysis based on such data. Thus, it could be inferred that the responses obtained from the respondents are dependable and consistent and the items (factors) are reliable and valid.

It is duly acknowledged here that this research was likely to be affected by some certain constraints and biases, which is common for survey based research works of this nature. The adoption of judgemental sampling method in selecting the sample also helps to reduce bias by offering the researcher some degree of control. As it was a structured questionnaire survey, evaluation of the factors' level of severity was limited to only the selected professional (respondents). Even though the size of the study sample may perhaps be relatively small, findings of this paper produce useful guidance that could be used to highlight critical shortfalls of the contractual provisions of the PWC that require urgent attention. Notwithstanding the limitations highlighted before now, it is the opinion of the authors that the severities of the factors in the order of prioritization presented in this paper satisfactorily represent the opinions of the stakeholders in the Saudi construction industry.

5. Conclusion

This part presents the main conclusions from the preceding sections. It draws together the major themes of the paper. Questionnaire surveys were carried out across the construction industry to identify and prioritize the contraction provisions of the PWC (factors) that cause dissatisfaction to contractors in the contract administration of public infrastructure projects in Saudi Arabia. Severity index analysis was used to analyze the respondents' feedbacks. Thereafter, a ranking of the factors was produced. Findings of the study suggest that *valuation of variations*, *site risks allocation, subcontracting*, *security for advance payments*, and *final payment delays* were the most critical factors (contractual mechanisms of the PWC) that affect contractors in the contract administration of public infrastructure projects in Saudi Arabia.

This paper provides original contribution to knowledge through a methodical investigation of determining the shortfalls of the PWC as they affect Contractors in the contract administration of public infrastructure projects in the Kingdom. Consequently, the current shortfalls of the PWC were identified and valuable strategies were suggested to overcome the highlighted limitations. In essence, the paper presents a pioneering attempt and methodology that highlighted the weaknesses of the Public Works Contract, which is the legal framework governing the contract for engaging construction companies to perform public infrastructure works in Saudi Arabia. The paper makes pioneering attempt to draw the attention of authorities and key stakeholders concerned to urgently consider some amendments to the Public Works Contract in order to improve the shortfalls identified in this paper. This could boost the confidence of both local and prosperous foreign contractors and attract them to invest their capital and technical expertise in the Kingdom's construction industry.

6. Recommendations

The adoption of a project alliancing contracting approach can help to reduce some of the problems faced by public project owners and contractors due to the shortfalls of some contractual provisions of the PWC for certain high risk acquisition projects, including inappropriate risk allocation, valuation of variations, cost overruns, time overruns, and adversarial relationships within contracting parties. As a new approach for undertaking constructing projects that's a dramatic departure from traditional contracting practices, project alliancing demands collaboration, cooperation, no-blame culture, equitable sharing of risk and reward, and open and sincere communication between the parties. In project alliancing, all uninsurable project risks are shared between participants of alliance project, as against the specific allocation of risk, which is common practice in traditional standard forms of contract like the PWC. Project Alliancing manages project risks entirely differently from traditional contracts like the PWC that attempt to allocate (or shed) risk between project participants. Project alliancing comes with the 'pain-share-gain-share' compensation model structure, which ensures that all uninsurable project risks are shared between the contracting parties with the belief that collective responsibility leads to enhanced overall project outcomes. The effect of sharing project risks as opposed to allocating risk is that the project team will either win or lose as a team. Thus, this creates an environment where teamwork and collaboration are essential for project success. In this new contracting approach, there is no incentive for one party to emphasize on maximizing individually, since the individual will only succeed if the overall team and project becomes successful. This helps to ensure that all key project decisions are being made to be "best for project" as opposed to "best for self" decisions.

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