# AN ASSESSMENT OF THE IMPACT OF PROJECT RISK FACTORS ON PROJECT COMPLETION TIME IN NIGERIA

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***Abstract***
Completion time is an important criterion for determining construction project success. Many construction projects are completed behind schedule as a result of various risks involved in construction projects. Performance of project completion time can be improved if the risk factors that could cause delay are evaluated and managed. This study assessed the impact of project risk factors on completion lime of construction projects. Data was collected using structured questionnaires administered to 192 construction practitioners. 138 questionnaires were duly completed and returned but only 114 (59.38%) were found fit for analysis. Descriptive statistics was used to analyse the data. The study identijied financial difficulties of owner' (MS = 4.35), 'inadequate time estimate' (4.33), 'delay in progress payment by owner/client' (4.23), 'poor labour productivity' (4.22), 'shortage of skilled labour' (4.18) and frequent design changes' (4.05) to be the topmost risk/actors that impact on project completion time. The study concludes that financial', 'design' and 'contract administration and project management' related factors group are those with high impact on project completion time.
**Keywords: Completion time, Construction projects, Impact, Risk factors**

## Introduction

Construction industry has a poor reputation in risk analysis when compared with others such as finance or insurance (Laryea, 2008). The Construction industry and its stakeholders are afflicted with a high degree of risk because of the nature of construction environment, organizations, business activities and processes (*Ibironke, Famakin & Akingunola, 2011*). In the industry, risk is a combination of activities that affect the project objectives (POs) of time, cost, and quality and scope (Ehsan, Alam, Mirza, & Ishaque, 2010). Chieng, Wu and Huang (2014) argued that, the size and complexity of construction projects (CPs) are increasing, thereby increasing risk. ISO 31000 (ISO, 2009) defines risk as any event that has the potential of hindering the achievement of objectives. In construction projects context, risk management (RM) is a systematic way of identifying, analysing, and dealing with risks associated with a project so that the project objectives are achieved. According to Ehsan *et al.* (2010), RM is an important part of project management and has become an increasingly challenging activity because of the complexity of the processes involved (Azevedo, Ensslin, & Jungles, 2014). Although RM can be sophisticated and complicated, the starting point should be an assessment of the problem and possible solutions (Nnadi & Ugwu, 2013). RM in Nigerian construction projects has been carried out in a very limited and ineffective way (Adeleke, Bahaudin & Kamaruddeen, 2015). Each project has many associated risks that affects it success. These risks differ between projects, depending upon technology, finance, construction site, size of project and so on (Adeleke, et al., 2015). Dada and Jagboro (2007) posited that one of the major reasons that lead to poor or ineffective project delivery in Nigerian construction industry is improper assessment of risk factors. This results to persistent poor performance, with so many projects failing to meet completion time target. Since risk factors may have a varying impact on different project objectives, it becomes necessary to assess the impact of project risk factors (PRFs) on project completion time. The purpose of this study is to assess the impact of PRFs on project completion time in order to assist in minimising time overruns in construction projects.

## Construction Project

Construction project deals with the process of creating physical infrastructure such as buildings, highways, airports and utilities. Construction projects consist of various stages or phases as described by different authors with all leading to the similar project life cycles. Liu and Zhu (2007) divide construction stages into *conceptual, design, tender, preconstruction, and construction. Zou, Zhang and Wang, (2006) also divided the* stages of a construction project into feasibility, design, construction, and operation. PMI (2004) defined phases of construction project as Concept, Planning, Detailed Design, Construction, and post Construction. The number of phases may also increase depending on the managers' viewpoint. Each phase may be subdivided in order to focus on the details of each phase separately and more cautiously

## Risk in Construction Projects

According to PMI (2004) project risk is an uncertain event or set of circumstances that its occurrence will *have an effect on achievement of one or more project objectives. Risk in relation to construction is an event* in the process of a construction project in which its occurrence will lead to uncertainty in the final cost,

duration or quality of the project (Akintoye & Macleod, 1997). Such events are numerous with regard to construction projects.

**Classification of Construction risk**

Various institutes and authors have classified construction risks into different types and hierarchies. Smith and Bohn (1999) have classified construction risk as either internal or external. Risk has also been broadly categorized as either subjective or objective. Risks can be further subcategorized into smaller groups according to their type and impact. Wiguna and Scott (2006) classified risks into four categories: economic and financial risks, external and site condition risks, technical and contractual risks, and managerial risks. PMI (2004) also categorise risk into another four categories: Technical risks, organizational risks, project risks and external risks (TOPE risks).

**Construction Project Risk Management**

Uher (2003) defined risk management (RM) as the logical way of identifying areas of risk and consciously determining how each should be treated. It is a management tool that aims at identifying sources of risk and uncertainty, determining their impact, and developing appropriate management responses. Many authors have examined the issue of RM in CPs. PMI(2004) provided four (4) phases of the RM process: Identification, quantification, responses development and control. RM covers the process of identification, assessment, allocation, and management of all project risks (Abrahamsson, 2002).

**Risk Factors affecting Construction Projects**

In line with the context of this research, generating robust risk factors that affect construction projects is necessary. Previous studies which conducted robust review of construction risk factors were explored. Laryea *et al* (2012) identified a total of 42 major risk factors that affect construction business in West African countries. Enshassi and Mosa (2008) also identified 44 construction project risk factors and categorized them into nine groups. Aliyu (2013) identified 15 risk factors that affect construction projects in Nigeria. Baba (2014) also identified 60 risk factors affect construction projects in Nigeria. Furthermore, Hedaya and Saad (2017) identified 45 risk factors affecting construction projects. The reviewed risk factors were harmonised, yielding a total of 65 risk factors, which are classified under 10 groups. These are: Contract Administration and Project Management related, consists of 7 factors; Design related, consists of 6 factors; Construction and Contractors Site Management related, consists of 20 factors; Financial related, consists of 7 factors; Information and Communication related, consists of 3 factors Legal related, consists of 4 factors; Human Resource (workforce) related, consists of 7 factors; Economic related, consists of 5 factors; Political related, consists of 3 factors; and Environmental related, consists of 3 factors. The harmonised risk factors are used to develop the data collection instrument for the study.

**Methodology**

Quantitative research approach was adopted. Data was collected using structured questionnaire. The population of the study is infinite, thus, sampling frame cannot be established. Sample size was determined in accordance with Cochran (1977), using 95% confidence level, 10% confidence interval and 50% degree of variability. A minimum sample size of 96 was obtained. Glenn (1992) suggested increasing the sample size to account for non-responses and incomplete responses. However, considering the large number of variables contained in the data collection instrument and the response rate obtained from similar studies containing large number of variables in the survey instrument, this study assumed a valid response rate of at least 50% of the total number of questionnaires distributed. Therefore 100% of the estimated sample size was added. 192 questionnaires were distributed to Architects, Builders, Engineers, Quantity Surveyors and Project Managers using convenience sampling technique. 138 were duly completed and returned while only 114 were found fit for analysis representing 59.38% valid responses. In order to enable assessment, respondents were asked to rate the impact of the risk factors on project completion time, using a 5-point scale. A risk impact assessment guide by PMI (2004) as shown in Table 1 was adopted to guide the respondents. Descriptive statistics was used to analyse the data. Mean scores and standard deviation were computed and used to rank the impact of the risk factors on PCT. Risk factor having mean value ranging from 0 to1.49 is considered as having very low impact, while risk factor with mean score 1.5 to 2.49 is considered as having low impact, risk factor with mean score 2.5 to 3.49 is considered as having moderate impact, risk factor with mean score 3.5 to 4.49 is considered as having high impact and risk factor with mean

score ≥ 4.5 is considered as having very high impact. The standard deviation was used to rank the factors where there is a tie in the mean scores.

Table 1: Risk impact assessment guide

| Risk factor | Project objectives | Negligible 1 | Low 2 | Moderate 3 | High 4 | Very high 5 |
|---|---|---|---|---|---|---|
| N | TIME | <5% time increase (Insignificant ) | 5-10% time increase | 10-15% time increase | 15-20% time increase | >20% time increase |

***Source**: PMI (2004)*

## Results and Discussion

Assessment of Impact of the Risk Factors on Project Completion Time (PCT) was carried out. Respondents were presented with 65 risk factors affecting construction projects and were asked to rate the impact of the risk factors on project completion time on a 5 point scale as described in the methodology. The risk factors are categorised into 10 groups and the results are presented in Tables 2, 3 and 4.

Table 2: Impact of the Risk Factors on Project Completion Time (Group wise)

| S/N | Risk Factors | Mean | SD | Group Rank |
|---|---|---|---|---|
| A | Contract Administration and Project Management Related | | | |
| 1 | Poor project management | 3.98 | .872 | 1 |
| 2 | Change in the scope of the work | 3.81 | .797 | 2 |
| 3 | Bribery and Corruption | 3.54 | .854 | 3 |
| 4 | High Competition in Bids | 3.39 | .928 | 4 |
| 5 | Delay in decision making | 3.37 | .953 | 5 |
| 6 | Undefined scope of work | 3.33 | 1.062 | 6 |
| 7 | Inaccurate quantity take-off | 3.24 | .539 | 7 |
| | Group Mean/SD | 3.52 | .858 | |
| B | Design Related Factors | | | |
| 1 | Frequent design changes | 4.05 | .891 | 1 |
| 2 | Mistakes/ errors in design | 3.99 | .785 | 2 |
| 3 | Poor design | 3.78 | 1.079 | 3 |
| 4 | Incomplete design at the time of tender | 3.69 | .783 | 4 |
| 5 | Delay in design | 3.25 | .782 | 5 |
| 6 | Delay in approval of design | 3.01 | .991 | 6 |
| | Group Mean/SD | 3.63 | .885 | |
| C | Construction and Contractor's Site management Related | | | |
| 1 | Inadequate time estimate | 4.33 | .772 | 1 |
| 2 | Inadequate experience by project team | 3.90 | .852 | 2 |
| 3 | Mistakes during construction | 3.79 | .860 | 3 |
| 4 | Schedule delay | 3.75 | .807 | 4 |
| 5 | Deviating from specifications due to misunderstanding of drawings | 3.71 | .952 | 5 |
| 6 | Shortage of materials | 3.70 | .531 | 6 |
| 7 | Late delivery of materials | 3.59 | .752 | 7 |
| 8 | Inadequate cost estimate | 3.58 | .842 | 8 |
| 9 | Late delivery of equipment | 3.54 | .807 | 9 |
| 10 | Inadequate project monitoring | 3.46 | 1.006 | 10 |
| 11 | Poor site management | 3.46 | .720 | 11 |
| 12 | Poor site supervision | 3.45 | .705 | 12 |
| 13 | Equipment unavailability | 3.44 | .729 | 13 |
| 14 | Inadequate project control | 3.44 | .733 | 14 |
| 15 | Equipment failure | 3.20 | .731 | 15 |
| 16 | Undocumented change orders | 3.18 | .878 | 16 |
| 17 | Incompetent subcontractors | 3.18 | .644 | 17 |
| 18 | Materials theft | 2.84 | .983 | 18 |
| 19 | Labour accident | 2.56 | .810 | 19 |
| 20 | Materials wastage | 2.42 | .703 | 20 |
| | Group Mean/SD | 3.43 | .791 | |
| D | Financial Related Factors | | | |
| 1 | Financial difficulties of owner | 4.35 | .741 | 1 |
| 2 | Delay in progress payment by owner/client | 4.23 | .679 | 2 |
| 3 | Poor cash flow management | 3.96 | .813 | 3 |
| 4 | Financial failure of contractor | 3.94 | .998 | 4 |
| 5 | Delay in payment to supplier/subcontractor | 3.94 | .672 | 5 |

| | | | | |
|---|---|---|---|---|
| 6 | Poor financial control on site | 3.66 | .739 | 6 |
| 7 | Contractual claims | 3.25 | .885 | 7 |
| | Group Mean/SD | 3.90 | .663 | |
| E | Information and Communication Related Factors | Mean | SD | Group Rank |
| 1 | Slow information flow between stakeholders | 3.39 | .747 | 1 |
| 2 | Poor communication between stakeholders | 3.27 | .801 | 2 |
| 3 | Lack of coordination between stakeholders | 3.22 | .606 | 3 |
| | Group Mean/SD | 3.29 | .718 | |
| F | Legal Related Factors | | | |
| 1 | Difficulty of obtaining permits from regulatory authorities | 3.18 | 1.264 | 1 |
| 2 | Lack of specialised arbitrators to help settle dispute fast | 3.07 | .884 | 2 |
| 3 | Legal disputes during construction phase among contract parties | 3.06 | .998 | 3 |
| 4 | Ambiguity of work legislations | 2.50 | 1.329 | 4 |
| | Group Mean/SD | 2.95 | 1.119 | |
| G | Human Resource (Workforce) Related Factors | | | |
| 1 | Poor labour productivity | 4.22 | .890 | 1 |
| 2 | Shortage of skilled labour | 4.18 | .878 | 2 |
| 3 | Shortage of unskilled labour | 3.67 | .816 | 3 |
| 4 | Shortage of technical personnel | 3.38 | .745 | 4 |
| 5 | Labour absenteeism | 3.03 | .867 | 5 |
| 6 | Difficulty in training new labour | 2.90 | 1.212 | 6 |
| 7 | High cost of labour | 2.85 | .975 | 7 |
| | Group Mean/SD | 3.46 | .912 | |
| H | Economic Related Factors | | | |
| 1 | Increase in exchange rates | 3.25 | .917 | 1 |
| 2 | Increase in interest rates | 3.19 | 1.021 | 2 |
| 3 | Increase in prices of materials | 3.16 | .892 | 3 |
| 4 | Increase in cost of labour | 3.04 | .976 | 4 |
| 5 | Increase in fuel/oil Prices | 2.72 | .955 | 5 |
| | Group Mean/SD | 3.07 | .952 | |
| J | Political Related Factors | | | |
| 1 | Political crises/Civil unrest | 3.96 | 1.052 | 1 |
| 2 | Unfavourable Governmental policies | 3.06 | 1.011 | 2 |
| 3 | Changes in governmental Laws | 2.74 | 1.007 | 3 |
| | Group Mean/SD | 3.26 | 1.023 | |
| K | Environmental Related Factors | | | |
| 1 | Unfavourable project location | 3.54 | .879 | 1 |
| 2 | Force majeure (earthquake, flood etc.) | 3.48 | 1.322 | 2 |
| 3 | Effects of weather | 3.33 | 1.196 | 3 |
| | Group Mean/SD | 3.45 | 1.132 | |

Source: Field Survey (2019)

Table 2 present the impact of the risk factors on project completion time. As seen in the Table, a total of 65 risk factors were presented and grouped into 10. For contract administration and project management related factors, poor project management has the highest mean value (3.98) and is therefore considered as the risk factor with the highest impact on project completion time within this group thus ranked 1st. Change in the scope of the work (3.81) and risk incurred due to bribery and corruption (3.54) are the 2nd and 3rd risk factors with highest mean value. On the other hand, inaccurate quantity take-off having a mean value of (3.24) is ranked 7th and therefore considered as the risk factor having the lowest impact on project time. Also as it can be seen that the first three risk factors in terms of their rank have high impact on project completion time having a mean value within the range of (3.50 to 4.49) while the remaining risk factors all have mean value ranging from (2.51 to 3.49) and are considered as having moderate impact on project completion time. Furthermore, this group has an overall mean value of (3.52)which is considered to be high. The second group is the design related risk factors. Under this category, it can be seen that, the risk factor with highest impact is frequent design changes, having a mean score of (4.05) and is therefore ranked first. This is followed by mistakes/ errors in design (3.99) and Poor design (3.78) ranked 2nd and 3rdrespectively. On the other hand, the risk factor with the least impact is delay in approval of design, having a mean value of (3.01) and therefore ranked 6th. Risk factors ranked 1st to 4th under this group have a mean value ranging from 3.50 to 4.49 and are therefore considered as having high impact on project completion time, while those ranked

5th and 6th have a mean value ranging from (3.50 to 3.49) hence considered as having moderate impact. This group also has an overall mean value of (3.63),which is also considered to be high

Construction and contractors site management related group consist of 20 factors. Under this group, the three with the highest mean score are inadequate time estimate (4.33), inadequate experience by project team (3.90) and mistakes during construction (3.75). On the other hand, Materials theft (2.84), labour accident (2.56) and materials wastage (2.42) are the risk factors with the lowest mean value thus ranked 18th 19th and 20threspectively. Furthermore, out of the 20 risk factors under this category, nine (ranked 1st to 9th) have a mean score ranging from (3.5 to 4.49) and are therefore considered as having high impact, while factors ranked 10th to 19th have mean score ranging from (2.5 to 3.49) and are therefore considered as having moderate impact The factor ranked 20th have a mean score < 2.5 hence considered as having low impact.. This group has an overall group mean of (3.43), thus considered as moderate impact on project completion time Under financial related factors, the three with highest mean score are financial difficulties of owner/client with mean score of (4.35), delay in progress payment by owner/client (4.23) and poor cash flow management (3.96). These are ranked 1st, 2nd and 3rd respectively. It can be seen that all the risk factors under this category with the exception of contractual claims (3.25) have mean score ranging from (3.5 to 4.49) and therefore can be considered as having high impact on project completion time. This group also has an overall group mean of 3.90. Information and communication related group has all the 3 factorshaving a mean score ranging from 2.50 to 3.49, and are considered as having moderate impact on project completion time. The risk factor with highest mean score under this category is slow information flow between stakeholders (3.39) followed by poor communication between stakeholders (3.27) and lack of coordination between stakeholders (3.22). The group also has an overall mean score of 3.29. Under legal related Group, the risk factor with highest impact is difficulty of obtaining permits from regulatory authorities (3.18). This is followed by lack of specialised arbitrators to help settle dispute fast (3.07), legal disputes during construction phase among contract parties (3.06) and ambiguity of work legislations(2.50). All the risk factors under this category have a mean score ranging from 2.50 to 3.49. The group also has an overall mean score of 2.95, thus considered as having moderate impact on project completion time.

Under the human resource related group, the three risk factors with the highest mean values are poor labour productivity with mean score of (4.22), shortage of skilled labour (4.18) and Shortage of unskilled labour (3.67). On the other hand, the risk factors with lowest mean values are labour absenteeism (3.03), difficulty in training new labour (2.90), and high cost of labour (2.85) and are ranked 5th, 6th and 7th respectively. Furthermore, the risk factors ranked (1st to 3rd) have mean score ranging from 3.5 to 4.49 therefore are considered as having high impact on project completion time while risk factors ranked 4th to 7thhave a mean score ranging from 2.50 to 3.49 and are considered as having moderate impact. In the economic related category, the risk factor with highest mean score is increase in exchange rate with a mean score of (3.25), followed by increase in interest rate (3.19). The risk factor with the lowest mean score is increase in fuel/oil prices with a mean score of (2.72). Furthermore all the risk factors under this category have mean score ranging from 2.5 to 3.49 and are considered as having moderate impact on project completion time. Political related group has political crises/civil unrest having mean score of 3.96, thus considered as having high impact on project completion time, while unfavourable governmental policies (3.06) and Changes in governmental Laws (2.74) have a mean value ranging from (2.5 to 3.49) and are considered as having moderate impact on project completion time. The group has an overall mean score of 3.26. The last group of the risk factors is the environmental related. The risk factor with the highest mean score under this category is unfavourable project location (3.54) and therefore ranked 1st followed by force majeure (earthquake, flood etc.) (3.48) ranked second and effects of weather (3.33) ranked 3rd. The risk factor ranked 1stis considered as having high impact on project completion time while the risk factors ranked 2nd and 3rd have mean values ranging from (2.50 to 3.49) thus considered as having moderate impact on project completion time. This group has an overall mean score of 3.45.

Comparing the group mean scores of the risk factors, financial related factors has the highest group mean (3.90) and therefore ranked 1st followed by design related factors having a mean score of (3.63) thus ranked 2nd while the groups with the lowest mean score are human resource (workforce) related factors and information and communication related factors having a mean score of (3.07) and 2.95) respectively thus ranked 9th and 10th. The results are presented in Table 3.

Table 3: Impact of the risk factors (group) on project completion time

| Risk factors group | Group Mean | S D | Group Rank |
|---|---|---|---|
| Financial related | 3.90 | 0.663 | 1 |
| Design related | 3.63 | 0.885 | 2 |
| Contract administration and project management related | 3.52 | 0.858 | 3 |
| Human resources (workforce) related | 3.46 | 0.912 | 4 |
| Environmental related | 3.45 | 1.132 | 5 |
| Construction and contractors' site management related | 3.43 | 0.791 | 6 |
| Information and communication related | 3.29 | 0.718 | 7 |
| Political related | 3.26 | 1.023 | 8 |
| Economic related | 3.07 | 0.952 | 9 |
| Legal related | 2.95 | 1.119 | 10 |

Source: Field Survey (2019)

As seen in Table 3, three out of ten groups of factors have a mean scores ranging from 3.5 to 4.49 thus considered as having high impact on project completion time. The remaining seven groups have a mean value ranging from 2.5 to 3.49, therefore considered as having moderate impact on project completion time. Financial related factors (3.90) are found to have highest impact on PCT followed by Design related factors (3.63) and Contract administration and project management related factors (3.52). These group of factors all have a mean value ranging from (3.5 to 4.49) which indicates that, the average overall impact of the risk factors under these groups are high. The finding is consistent with the work of Aftab, Ismail and Ade (2012) who also identified, design and documentation issues, financial management and contract administration related issues and contract administration related issues as the major factors affecting project completion time in Malaysia. Therefore more attention should be given to the risk factors under these categories identified as having high impact on PCT. Furthermore, Table 4 presents the overall impact of the risk factors on project completion time in descending order of their mean values.

Table 4: Impact of the risk factors on project completion time

| S/N | Risk Factors | Mean | SD | Rank |
|---|---|---|---|---|
| 1 | Financial difficulties of owner | 4.35 | .741 | 1 |
| 2 | Inadequate time estimate | 4.33 | .772 | 2 |
| 3 | Delay in progress payment by owner/client | 4.23 | .679 | 3 |
| 4 | Poor labour productivity | 4.22 | .890 | 4 |
| 5 | Shortage of skilled labour | 4.18 | .878 | 5 |
| 6 | Frequent design changes | 4.05 | .891 | 6 |
| 7 | Mistakes/ errors in design | 3.99 | .785 | 7 |
| 8 | Poor project management | 3.98 | .872 | 8 |
| 9 | Poor cash flow management | 3.96 | .813 | 9 |
| 10 | Political crises/Civil unrest | 3.96 | 1.052 | 10 |
| 11 | Delay in payment to supplier/subcontractor | 3.94 | .672 | 11 |
| 12 | Financial failure of contractor | 3.94 | .998 | 12 |
| 13 | Inadequate experience by project team | 3.90 | .852 | 13 |
| 14 | Change in the scope of the work | 3.81 | .797 | 14 |
| 15 | Mistakes during construction | 3.79 | .860 | 15 |
| 16 | Poor design | 3.78 | 1.079 | 16 |
| 17 | Schedule delay | 3.75 | .807 | 17 |
| 18 | Deviating from specifications due to misunderstanding of drawings | 3.71 | .952 | 18 |
| 19 | Shortage of materials | 3.70 | .531 | 19 |
| 20 | Incomplete design at the time of tender | 3.69 | .783 | 20 |
| 21 | Shortage of unskilled labour | 3.67 | .816 | 21 |
| 22 | Poor financial control on site | 3.66 | .739 | 22 |
| 23 | Late delivery of materials | 3.59 | .752 | 23 |
| 24 | Inadequate cost estimate | 3.58 | .842 | 24 |
| 25 | Late delivery of equipment | 3.54 | .807 | 25 |
| 26 | Bribery and Corruption | 3.54 | .854 | 26 |
| 27 | Unfavourable project location | 3.54 | .879 | 27 |
| 28 | Force majeure (earthquake, flood etc.) | 3.48 | 1.322 | 28 |
| 29 | Inadequate project monitoring | 3.46 | 1.006 | 29 |
| 30 | Poor site management | 3.46 | .720 | 30 |
| 31 | Poor site supervision | 3.45 | .705 | 31 |
| 32 | Equipment unavailability | 3.44 | .729 | 32 |
| 33 | Inadequate project control | 3.44 | .733 | 33 |
| 34 | Slow information flow between stakeholders | 3.39 | .747 | 34 |

| | | | | |
|---|---|---|---|---|
| 35 | High Competition in Bids | 3.39 | .928 | 35 |
| 36 | Shortage of technical personnel | 3.38 | .745 | 36 |
| 37 | Delay in decision making | 3.37 | .953 | 37 |
| 38 | Undefined scope of work | 3.33 | 1.062 | 38 |
| 39 | Effects of weather | 3.33 | 1.196 | 39 |
| 40 | Poor communication between stakeholders | 3.27 | .801 | 40 |
| 41 | Delay in design | 3.25 | .782 | 41 |
| 42 | Contractual claims | 3.25 | .885 | 42 |
| 43 | Increase in exchange rates | 3.25 | .917 | 43 |
| 44 | Inaccurate quantity take-off | 3.24 | .539 | 44 |
| 45 | Lack of coordination between stakeholders | 3.22 | .606 | 45 |
| 46 | Equipment failure | 3.20 | .731 | 46 |
| 47 | Increase in interest rates | 3.19 | 1.021 | 47 |
| 48 | Incompetent subcontractors | 3.18 | .644 | 48 |
| 49 | Undocumented change orders | 3.18 | .878 | 49 |
| 50 | Difficulty of obtaining permits from regulatory authorities | 3.18 | 1.264 | 50 |
| 51 | Increase in prices of materials | 3.16 | .892 | 51 |
| 52 | Lack of specialised arbitrators to help settle dispute fast | 3.07 | .884 | 52 |
| 53 | Legal disputes during construction phase among contract parties | 3.06 | .998 | 53 |
| 54 | Unfavourable Governmental policies | 3.06 | 1.011 | 54 |
| 55 | Increase in cost of labour | 3.04 | .976 | 55 |
| 56 | Labour absenteeism | 3.03 | .867 | 56 |
| 57 | Delay in approval of design | 3.01 | .991 | 57 |
| 58 | Difficulty in training new labour | 2.90 | 1.212 | 58 |
| 59 | High cost of labour | 2.85 | .975 | 59 |
| 60 | Materials theft | 2.84 | .983 | 60 |
| 61 | Changes in governmental Laws | 2.74 | 1.007 | 61 |
| 62 | Increase in fuel/oil Prices | 2.72 | .955 | 62 |
| 63 | Labour accident | 2.56 | .810 | 63 |
| 64 | Ambiguity of work legislations | 2.50 | 1.329 | 64 |
| 65 | Materials wastage | 2.42 | .703 | 65 |

Source: Field Survey (2019)

Table 4 present the overall impact of the 65 risk factors on project completion time irrespective of their groupings. As seen in the Table, the first five risk factors with the highest mean scores are financial difficulties of owner (4.35), inadequate time estimate (4.33), Delay in progress payment by owner/client (4.23), Poor labour productivity (4.22) and Shortage of skilled labour (4.18). These risk factors are ranked 1st, 2nd, 3rd, 4th, and 5th, respectively. On the other hand the last five risk factors having the lowest mean score are changes in governmental Laws having a mean value of (2.74), increase in fuel/oil Prices (2,72), labour accident (2.56), Ambiguity of work legislations (2.50) and materials wastage (2.42) and are therefore ranked 61st, 62nd, 63rd, 64th and 65th respectively. Furthermore, out of the 65 risk factors considered in the study, twenty seven risk factor (those ranked 1st to 27th ) have a mean value ranging from (3.5 to 4.49) and are therefore considered to have high impact on projects completion time. This implies that, these risk factors may likely lead to 15-20% time increase if not properly managed. Furthermore, thirty seven risk factors (those ranked 28th to 64th) have a mean score ranging from (2.5 to 3.49) hence, can be considered as having moderate impact on project completion time. This means that, these risk factors could result to 10-15% project time increase. Meanwhile, only one risk factor (material wastage) has a mean score ranging from (1.5 to 2.49) hence considered as having low impact and implies that, the risk factor may likely lead to <5% time increase.

**Conclusion and Recommendations**

This study assessed the impact of project risk factors on completion time of construction projects. General perception of construction practitioners was sought regarding the impact of the risk factors on project completion time. The paper concludes that the risk factors have a varying degree of impact on construction projects completion time. Furthermore, the paper identified financial difficulty of clients, inadequate time estimate, and delay in progress payment by clients, poor labour productivity, shortage of skilled labour, frequent design changes among others to be the risk factors with highest impact on project completion time. The study recommends that, clients should always ensure that, funds are available and released when due so that the projects are completed at the required time. Furthermore, contractors should also ensure that, their

construction programs are carefully prepared to determine the minimum completion period to be stated in their form of tender. In doing that, considerations should be given to some factors such as lead times for orders of materials and equipment, and their deliveries to the site as well as their installations, Risks associated with on-site and off-site activities that are generally outside the contractor's control. Also, workers should be motivated to achieve optimal productivity and design changes should as much as possible be avoided by preparing a comprehensive design prior to selecting the contractor. The limitation of this research is that, the frequency of occurrence of the risk factors in construction projects is not considered, in the next phase of this research, the frequency of occurrence of the risk factors will be assessed in order to determine the significance of the effect of the risk factors on project completion time. This is because a risk factor may have high impact but low frequency of occurrence, as such the effect of the risk factor may likely not be significant.

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