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Financial Effect of Labour Related Risks on Completion of PPP Projects

Pamela Akinyi Oyieyo
School of Open and Distance eLearning,
University of Nairobi, Nairobi, Kenya

Prof Charles M. Rambo
Ph. D, School of Open and Distance eLearning,
University of Nairobi, Nairobi, Kenya

Dr. Anne Ndiritu
Ph. D, School of Open and Distance eLearning,
University of Nairobi, Nairobi, Kenya

ABSTRACT

Efficient management of construction works should focus its attention on utilizing labour, equipment, and raw materials in the right way. Besides, they claim that responsible parties should evaluate labour productivity continuously and that cost control measures should be developed. Low productivity witnessed in construction is linked to internal challenges including disputes, abandonment of projects, excess budget, and time overlaps. The objective of the study was to determine the financial effect of labour related risks on completion of PPP projects. A descriptive survey design was used with simple random sampling targeting 85 members of the management team at the completed Sondu-Miriu Power project. The participants were administered with questionnaire which were sent by mail (in some cases) and selected participants encouraged to respond. Data obtained was analysed through SPSS platform using descriptive statistics and Pearson Moment correlation as inferential statistics. The study found that labour related risks in construction PPP projects included failure by employees and experts to complete assigned tasks, injuries and deaths, changing labour demands during the project as well as cases of go slow. Construction labour related risks affected the financial cost, time and quality of work performed in the construction project. The study concludes that labour related risks have a financial effect on completion of PPP projects such that as the risks increase, the financial cost increases. The study recommends that more focus should be placed on the identification and recruitment of project staff as well task allocation.

Keywords: Financial Cost; Labour Related Risks; Completion of Projects; Public-Private Partnership

INTRODUCTION

To date, it is widely recognized that risk management, which comprises identification of risks and design controls to address them, is a critical element in the success of PPP projects [1]. Smith, Merna and Jobling [2] also points that risk has emerged as a key feature of PPP contracts as it can shift the balance between conventional public procurement the PPP option [2]. Overall, the completion of construction projects adequately must meet the time, cost and labour parameters as envisaged in project inception and preparation to which there are risks associated. These risks can take different forms. However, the most visible one is a labour dispute, which might be in the form of manufactured disputes, unnecessary meetings and strikes. According to Murali and Yau [3], labor productivity and supply may also delay projects. Similarly, Odeh and Battaineh [4] claim that both meetings and strikes can also delay projects. Yaw and Oluwoye [5], on the other hand, identify labor shortage as a significant factor that hinders projects. Sadi, Asce and Muhammad [6], on their part identify low productivity in labor and shortage of labor as factors that delay projects. Sweis, Sweis, Abu Hammad, and Shboul [7] identify labour shortage in terms of unskilled or semi-skilled labour as a factor that delays project completion.

Labour Related Risks are the risks associated with human resources or workers in the construction project, which, according to this study, include the Selection of employees, Supervision, excessive hours of work, wage compensation and assignment of duties. In light of the above, [8] claim of efficient management of construction works should focus its attention on utilizing labour, equipment, and raw materials in the right way. Besides, they claim that responsible parties should evaluate labour productivity continuously and that cost control measures should be developed. The low productivity witnessed in construction is linked to internal challenges including disputes, abandonment of projects, excess budget, and time overlaps. In separate studies, [9] and [10] established that variation across geographical regions is also another problem linked to labour productivity in construction.

The extent to which contractors conform to occupational safety as well as health is used as a measure of the success of a project. The study by [11] on performance criteria within Nigerian construction industry noted that most important performance indicators for evaluating project performance were quality of the construction work when completed, cost incur to complete the project and time taken in the delivery of the designed project in successive order. Quality coordination and occupational health and safety take positions five and six, respectively. Tipili and IIyasu [11] further put it that the management of safety and health faces a variety of challenges and that construction workplaces may be vulnerable to occupational illnesses and adverse effects of excessively long working hours, machines and other factors occurring along the construction process.

Besides, lack of expertise was established to be another source of danger in the projects because some of the people using tools and machines do not wear protective gadgets. He further says that Health and safety measures are inadequate and effective enforcement mechanisms of health and safety are lacking. The contractors are supposed to ensure adequate health protocols and safety guidelines to minimize occurring accidents and to maintain a healthy working environment [11]. Based on the findings of [11], delays and failure to deliver project phases affects the overall project delivery hence a significant factor in the completion of PPPs. Thus, the labour related risks result into additional financial costs on the project eventually affecting the overall project completion.

This study relies on an already completed Sondu-Miriu Hydroelectric Power Project which was an infrastructural project that was implemented by Kenya Electricity Generating Company limited (Kengen) by the Republic of Kenya. Actual construction was started in March 1999 for the first phase which was to be completed in March 2003. Both the project cost and the project period exceeded the plan. The project was estimated to cost a total of 8,156million JPY but the actual cost was 9,088 million JPY, [12]. The project was expected to be completed in July 2002. However, the project extended time with about 30 months. Such delays and cost increase points to inherent risks. Thus, the study sets out to establish the extent to which the cost and time delays were attributable to labour related risks.

Objective

The objective of the study was to determine the financial effect of labour related risks on completion of PPP projects.

LITERATURE REVIEW

Every construction project has its own material, design, budget, technology and climate, and other things. As such, labour productivity in each project depends on various factors that affect its overall delivery. To achieve the desired benefits that are anticipated from every construction project and ensure that the project is successful, then productivity factors should be controlled to minimize their adverse effects on labor [13]. Consequently, there is a need to identify factors that impact labor productivity within construction projects, more so in mega projects, especially those under PPPs [13]. The practice in the construction industry is that project managers tend to outsource a large portion of their tasks to sub-contractors as a way of minimizing costs while increasing efficiency to work within the scheduled timelines [14]. This method is prevalent in the industry since it encourages the subcontractor to improve workforce and increase productivity. According to [15], it is therefore upon the sub-contractor to source for laborers. It negotiates remuneration terms consistent with the amount of work done thus their focus is on speedy completion of work for cost savings.

Studies that categorize risk factors of labour productivity have been conducted. In one such study, [16] investigated the factors influencing work efficiency for Malaysian residential projects". The study targeted 70 contractors, 11 developers and 19 consultants who participated by ranking 50 project-related factors. From the data obtained, indices were computed for the factors which were used for ranking. The study identified among other factors, material shortage, site congestion, slow response to issues of concern, late issuance of permission to relevant authorities, equipment shortage, poor weather conditions and claim certificates as some of the factors that risk labor productivity. Although [16] focused on identifying factors affecting labour productivity; it did not dwell into labor-related risks and the financial impact associated with it in the completion of PPP projects.

Five highest-ranking problems in labour related risks are weather conditions, equipment breakdowns, and deficiencies in drawings, material shortage, and site conditions. Zakeri, Olomolaiye and Gary [17] evaluated the 13 factors that affect labor productivity within Iranian construction operative's performance. The factors investigated by [17] included work, weather, safety, equipment, inspection delays, lack of materials, and site conditions. A questionnaire survey was utilized to collect data from 355 people who worked in 31 Iranian sites. With the help of the

relative index ranking technique, the study identified the most risk factors for labour productivity. From the study by [17], it emerged that the prevailing wars and political conditions in the area influence labour productivity as well as other construction factors.

Research has shown that environmental factors, non-project contributors, human resources, managerial activities and organizational factors are determinants of labour risks in construction projects and the overall completion of PPPs. In Nigeria, [18] investigated the factors negatively affecting construction labourers' performance, focusing on environmental factors, external factors, human/labour factors, management factors and organizational factors. The study was a survey that comprised of 12 factors, which included poor communication, late information, poor specification, work that is out of sequence, unfair wages, bad weather, lack of training and retraining. Statistical techniques were utilized to analyze various perspectives of the labourers and contractors. It was established that unfair wages with (RI = 0.89), lack of motivation with (RI = 0.79) and negative influencing factors with (RI = 0.85) were among the major factors that influenced labour productivity negatively. On the other hand, lack of training with (RI = 0.84), inclement weather with (RI = 0.71) and poor communication with (RI = 0.79) affected the performance labour. Despite the findings of the study by [18] indicating that unfair wages were a labour factor affecting the project, it did not determine the effect of such wage compensation on the completion of the project.

Elsewhere, the labour performance of the crew, supervision of projects, difficulties in construction, accurate estimates, design details and availability of skilled labour were postulated as factors affecting completion of PPPs. In Sri-Lanka, [19] conducted a study that evaluated factors that affected labour productivity within a bridge construction projects. The study adopted a questionnaire survey divided into two sections where participants were to rate the factors influencing completion of the project in the first section and indicated whether the factors adversely affected the construction of a bridge in the next section.

Similarly, work overtime, delays in payments, rework, poor estimates, schedule pressures, lack of motivation among workers, material shortage, and high cost of foreign labour affect directly project completion. In another research, [20] investigated factors that constrained labor productivity using a Turkmenistan case. The questionnaires for data collection from research participants was a 5 level Likert with 1 representing the lowest point and 5 the highest point. The questionnaire consisted of 28 questions that addressed issues that affected labour productivity. Using descriptive survey method, the study canvassed the views of subcontractors, contractors and project managers in Turkey. Multi-attribute analysis technique revealed that non-project factors significantly impact labour productivity. The internal constraints affected labor productivity up to 67 percent of onsite issues that influenced productivity.

The present study adopts a case study design of a completed project collecting views of government agencies, project managers, engineers, contractors and labourers to articulate the effect of labour related risks including occupational injury insurance cover, site accidents and deaths, wage rate and selection of employees on the completion of PPPs. Even though many studies have been conducted on factors that influence labour productivity, the fact remains that many issues are yet to be addressed; hence, the need for further studies, especially in developing countries. There is a feeling that those factors are different in developing countries. Similarly, [18] suggested that factors that influence labour productivity are not constant, meaning that they vary from one country to the

other. Besides, they vary from one project to the other and even depend on prevailing circumstances.

The great influence of construction industry on development and creation of job opportunities in Kenya is evident. Njogu [21] agrees with this opinion, thereby acknowledges the immense role it plays in national development. Despite these claims, studies conducted over the last few years have demonstrated construction projects in the country as underperforming. This has resulted in increased interest among mechanisms that evaluate measures for evaluating risks. Thus, [21] assessed the effects of risks on project delivery among Kenyan contractors. The study focused much of its attention on likelihood of construction risks occurring and the impacts they had on projects' safety, cost and quality. The study was conducted through structured questionnaires that were self-administered. The study targeted registered contractors in the country thereby sampling 190 in strata. One person was selected from each category of respondents. Both inferential and descriptive statistics were utilized to analyze the data. The study identified 23 risk factors as some of the factors that affected project delivery.

METHODS

In order to achieve the study objective, a descriptive survey design was used with simple random sampling targeting 85 members of the management team at the completed Sondu-Miriu Power project. Sample of 71 participants determined using Krejcie and Morgan (1967) table was arrived at and administered with questionnaire. Since some of the selected potential respondents had moved away from the study area and on to other projects, the questionnaires were sent by mail and selected participants encouraged to respond. Quantitative data obtained was analysed through SPSS platform using descriptive statistics and Pearson Moment correlation as inferential statistics. The findings were tabulated and compared to findings from other previous studies.

RESULTS AND DISCUSSION

Labour Related Risks

Financial effect of labour related risks was evaluated basing on a 5- item five-point Likert scale ranging from strongly disagreed to strongly agreed. Thus, the emerging data was summarized and aggregated in terms of response frequency and corresponding percentage with reference to each item as well as corresponding mean and standard deviation (Table 1).

Table 1 Labour Related Risks and Completion of Public Private Partnership Projects

Statements	SD	D	N	A	SA	Mean ± SD
Failure by some employees and experts to complete assigned tasks lead to rise in financial cost of the project	2	3	4	14	16	4.00±1.15
	5.1%	7.7%	10.3%	35.9%	41.0%	
Site injuries and deaths occurring during the project necessitated worker compensations	1	3	2	16	17	4.15±1.01
	2.6%	7.7%	5.1%	41.0%	43.6%	
Overtime work aimed at achieving timelines led to increased project cost	4	3	5	21	6	3.56±1.17
	10.3%	7.7%	12.8%	53.8%	15.4%	
Changing labour demands during the project execution led to increased wages	3	1	7	19	9	3.77±1.09
	7.7%	2.6%	17.9%	48.7%	23.1%	
There were cases of go slow and job boycotts due to issues of wages and compensation	3	4	4	12	16	3.87±1.28
	7.7%	10.3%	10.3%	30.8%	41.0%	
Composite Mean and Standard Deviation			**3.777 ± 0.373**			

With reference to results in Table 1 on statement that "*failure by some employees and experts to complete assigned tasks lead to rise in financial cost of the project*" results showed that of all the participants, 16(41.0%) strongly agreed with the statement while 14(35.9%) agreed. Thus, 30(76.9%) of the respondents cumulatively agreed that employee failure to complete assigned tasks lead to increased financial costs. However, 5(12.8%) of participants were cumulatively in disagreement while 4(10.3%) neither agreed nor disagreed. The item line mean (Mean = 4.00, SD = 1.15) was above composite mean (Mean = 3.777, SD = 0.373) indicating that delay in completion of tasks was prevalent thus labour aspects affecting timelines of activities, thus implying that there were failures by employees or experts to complete tasks assigned to them. This conforms to, [16] identified among other factors, shortage in materials, site congestion, delayed payments, equipment shortage, poor weather conditions, claim certificates and slow responses from site staffs as factors of affecting labour productivity.

On the statement that "*Site injuries and deaths occurring during the project necessitated worker compensations",* results showed among the participants, 16 (41.0%) agreed ,17(43.6%) strongly agreed while 2(5.1%) were neutral. on the statement. Further 3(7.7%) showed disagreement and 1(2.6%) indicated strong disagreement with the statement. However, 4(10.3%) of the study participants cumulatively disagreed that site injuries and deaths occurred during the project, which necessitated payouts and compensations to workers leading to increased financial costs in the project. Overall, it was found that site injuries and deaths occurred during the project which necessitated payouts and compensations to workers with the item line mean (Mean = 4.15, SD = 1.01) where item mean was significantly above composite mean (Mean = 3.777, SD = 0.373). This shows that site injuries and deaths were frequent hence delays and increased project costs.

On the statement that "*Overtime work aimed at achieving timelines led to increased project cost*", results showed that high proportion of participants 21(53.8%) agreed that overtime work aimed at achieving timelines led to increased wages hence project financial cost while another 6(15.4%) strongly agreed. Thus, 27(69.2%) respondents agreed that overtime work raised the project costs. However, 18% of the respondents disagreed with the statement while 12.8% were neutral. that overtime work aimed at achieving timelines increased the costs although to a moderate extent. This shows that the item line mean (Mean = 3.56, SD = 1.17) was below composite ((Mean = 3.777, SD = 0.373). Specifically, this indicates that the problem of overtime work was too pronounced in the project. Similar findings were arrived at by [18], who found that unfair wages with (RI = 0.89), lack of motivation with (RI = 0.79) and negative influencing factors with (RI = 0.85) were ranked high.

On the statement that "*changing labour demands during the project execution led to increased wages"*, results showed that within the participants' pool, 19(48.7%) who agreed that changing labour demands during the project execution led to increased wages as well as 9(23.1%) who strongly agreed with the statement. Thus, cumulatively 28(71.8%) of the respondents agreed that in labour demands resulting from design changes and various occurring during project execution led to increased wages. However, 7(17.9%) of the respondents were neutral regarding the statement that changing labour demands during the project execution led to increased wages with a cumulative 4(10.3%) cumulatively disagreeing. Increased wages resulting from the noted changing labour demands affected the completion of the project due to increased costs as well as delays. Changing labour demands during the project execution led to increased wages as indicated by the item line mean (Mean = 3.77, SD = 1.09) being almost equal to composite mean (Mean =

3.777, SD = 0.373). Thus, changing labour laws did not have greater influence on completion of the project compared to other indicators of labour related risks. The changing labour demands were associated with the changes in design and variations in the design emerging during the construction project.

On the statement "*that there were cases of go slows and job boycotts due to issues of wages and compensation"*, results showed out of all the participants 16(41.0%) strongly agreed with the opinion ,12(30.8%) agreed. This shows the problem of go-slows and boycotts existed during project execution as confirmed cumulatively by 28(71.8%) of the study participants. However, 3(7.7%) of the participants strongly disagreed 4(10.3%) disagreed while another 4(10.3%) were neutral giving an indication that the go-slows and job boycotts due to issues of wages and compensation was not universal across the whole project. There were cases of go slows and job boycotts due to issues of wages and compensation This occurrence significantly affected completion as indicated by the item line mean (Mean = 3.87, SD = 1.28) being above composite (Mean = 3.777, SD = 0.373).

The noted boycotts and go-slows were naturally not anticipated in the project schedule thus affected project execution with reference to quality, cost, and timelines. The above results are in line with those of [22] that, it is imperative upon the sub-contractor to source for laborers and negotiate remuneration terms consistent with the amount of work done thus their focus is on speedy completion of work for cost savings.

Influence of Labour Related Risks on Completion of Public Private Partnership Projects

To determine the financial effect of labour related risks and completion of PPP projects, Pearson correlation analysis was performed between the measure of two variables. Since the variables were measured on the ordinal Likert for individual items, there was need for conversion to continuous data for the analysis hence summated scores were obtained and correlated (Table 2).

Table 2 Correlation Output for Labour Related Risks and Completion of PPP Projects

Variables		Financial Effect of Labour Related Risks	Completion of construction project
Financial Effect of Labour Related Risks	Pearson Correlation	1	
	Sig. (2-tailed)		
	n	39	
Completion of construction project	Pearson Correlation	-0.729**	1
	Sig. (2-tailed)	0.000	
	n	39	39
**. The value is significant at 0.01 levels (2-tailed).			

Output Table 4.12 depicts a strong negative correlation (R = -.729) between the two variables which was statistically significant ($p < .001$, $p \leq 0.05$). The implication being that, statistically as labour related risks increase, PPP project execution declines significantly. Thus construction labour related risks affect completion of PPP projects. Similarly, [21] ranked labour related risks as a key determinant in completion of PPPs. Considering that labour is a major factor in actualizing construction projects, when risks associated with labour are dominant, completion of tasks are affected hence increasing in labour related risks results in decline in the completion of the project.

This emerges from go slows leading to delays, legal action associated with injuries and remuneration as well as poor workmanship affecting the quality of the project.

CONCLUSIONS AND RECOMMENDATIONS

Labour related risks in construction PPP projects included failure by employees and experts to complete assigned tasks, injuries and deaths, changing labour demands during the project as well as cases of go slow. Construction labour related risks affected the financial cost, time and quality of work performed in the construction project. Specifically, the study concludes that changing labour demands during the project execution lead to increased wages while some employees and experts assigned specific tasks fail to complete their assignment. Further, overtime work affects the productivity and quality of work. Overall, correlation was strongly negative between labour related risks and PPP implementation such that as the risks increase, project delivery declines as the financial cost increases.

Thus recommendation is made that more focus should be placed on the identification and recruitment of project staff as well task allocation. The stakeholders should participate in the recruitment of key staff to ensure that they have the required training and expertise for the project. The financier should ensure timely remittance of finances to prevent delays in payments and eliminate boycotts and go-slows, which hamper completion of construction.

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