

# Construction Time Overrun Related Risks as a Determinant of Completion of Public Private Partnership Projects in Kenya. Case Study of Sondu Miriu Hydropower Project

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**Abstract** — In development projects especially those of construction in nature, working within the time schedules is paramount and normally an issue of conflict. Emergence of Public Private Partnership to remedy delays in project has not been that perfect but provides a platform for risk sharing between stakeholders. This study borrowed on contingency theory to investigate the extent to which time overrun related risks impact on project delivery through PPP models. In the null, the hypothesis that time overrun related risks do not have an influence on project delivery was tested using entire management team of the completed construction project sampled randomly to give 71 participants. Questionnaires and interview schedules were applied to obtain research data. Quantitative and qualitative techniques were used in analysis where regression analysis was used to determine variable effects. The null hypothesis was tested at 95% confidence level and found that there was a strong negative correlation between the variables,  $r(38) = -0.975$  ( $p < .05$ ) which implies that construction time overrun related risks significantly influence project delivery. Thus, the null hypothesis was rejected. The study recommends that stakeholders in PPPs should come together at initial stages to ensure that project drawings are made and approved in time to facilitate speedy execution of the overall project and avoid unnecessary design changes by involving all stakeholders to reduce time overrun.

**Index Terms** — construction time overrun related risks, public private partnerships, completion of construction projects.

## I. INTRODUCTION

Keeping development projects inside timetables requires sound systems, great practices, and watchful judgment. To the aversion of proprietors, contractual workers and experts, be that as it may, of the numerous projects encounter broad postponements and subsequently surpass time projections. The problem is more pronounced in conventional contracting practice to pick lowest bidder during tendering, a popular practice for delivering public projects in emerging economies [1] The construction environment for public projects is complex with massive pressure for delivery within scheduled time [2]. The delays evident in construction projects are a sum component of weather variations, inadequate design and lack of resources thus are a consequence of internal and external occurrences to affect project implementation.

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The onset of PPP as a strategy in the implementation of projects for public benefit was witnessed during the 1990s to ensure project sustainability in emerging economies [3]. Due to its perceived success, PPP is accepted and recommended worldwide as a tool for efficient, transparent and effective strategy which guaranteed value for money for public sector projects which had previously known persistent and consistent failure leading to disappointments. This was so much so because the failure in the projects was attributed to wrong or poor choices of policies as well as bureaucracy [4]. The strategy of widening public sector was consequently in preference to PPP as a policy [3]. This is because, according to Reference [5], partnership in project delivery improves value of the project as both parties-private and public-enjoying benefits from each other.

### A. Research Hypothesis

The study tested the null hypothesis that:

*H<sub>0</sub>: Construction time overrun related risks does not significantly influence completion of Public Private Partnership Project in Kenya*

## II. LITERATURE REVIEW

### A. Completion of PPP Projects

Completion of PPP projects refers to the lifecycle of a project where it meets the time target, budget, quality requirements, health, safety and environment and client satisfaction. In this study, completion refers to the ultimate delivery of the project as had initially been envisaged. Public Private Partnership (PPP) has emerged as frequently favored model for achieving important projects to benefit the public (United Nations Economic Commission for Europe [6]. Seen as a solution to completion of large scale construction projects the public, this strategy has been overly popular in most projects today. Thus, international organizations, governments and private developers have appreciated and embraced the cost benefits of such arrangements hence their popularity.

### B. Construction time overrun related risks and completion of PPP projects

Construction time overrun refers to additional time beyond the projected time, taken to complete different project components and objectives which are attributable, decisions, resource availability, technical skills and planning. According to Reference [7] keeping development projects inside timetables requires sound systems, great practices, and watchful judgment. A study carried out by Reference [8] on project delivery using the Libyan case identified skills,

material costs, logistics and scope variation as strong contributors of time overrun as presented by contractors. Similarly, owners highlighted manpower skills, scope modification and delay in transition of site from owners to contractors as leading to delays. Where the risks are appreciated beforehand, the chances of the risks occurring are reduced to the point of diminishing [9]. Project managers therefore must model and predict as many risks as possible to mitigate against their occurrence during implementation [10].

Previous research has identified construction phase as having significant effect on time overrun in construction works. Reference [11] used descriptive research design where both questionnaires and interview schedule was used to collect data, taking the example of tunnel construction projects. The study noted that a significant part of the uncertainty results from lack of understanding of geotechnical compositions and human factors especially decision making. Reference [11] proposed adoption of reliable predictions which strives to provide the most practical estimates of risks using scientific models devoid of human judgement but previous statistical analysis. The study by Reference [11] focused on algorithm development using data from tunnel construction projects and not hydropower generation projects.

Similarly, [12] sought to establish design feasibility by focusing on concession characteristics encountered during design period and concluded that the success of the project is a factor of how detailed and adaptable the concession period structure is. Well-structured design brings everybody on board as it provides significant benefits to stakeholder. Whereas [12] focused on design concession period, the study did not investigate the influence of time related risks on project execution. Moreover, the study focused on major build-operate and transfer projects (BOT) using developed Monte Carlo simulation to evaluate NPV at risk.

This study was anchored on the contingency theory. Contingency refers to the interrelation between various components or elements of a project within the defined project systems thereby determining the sequence and tasks implemented to complete a module [13]. Contingency theory depicts that there are a range of factors leading to construction time overrun related risks which influence the project. This research investigates the influences of extending timelines on project execution.

### III. METHODOLOGY

In this study, pragmatism was favoured as paradigm with mixed methods adopted for data acquisition and synthesis [14]. To establish the relationship between the variables, correlation was used. Being a case study, the target population were management personnel active during the execution of the project who were 85 and sampled by [15] thus defining the sample as 71 members of management team. Interviews and questionnaires were applied in data collection which were distributed to sampled respondents categorized based on their role in the project to include contractor, engineer, employer and financier. The tools were pretested for validity and reliability in a similar project in the adjacent Homa Bay County. Qualitative data obtained was coded and clustered into themes for analyzing using thematic content. Descriptive statistics and inferential analysis using regression and correlation were applied on the quantitative data to statistically determine the relationship of time overrun risks on project delivery. Analysis was done on SPSS platform.

### IV. RESULTS AND DISCUSSIONS

#### A. Demographic Characteristics of the Respondents

The study found a response return rate of 39 out of the 71 sampled respondents (54.93%) which was reliable basing on [14] who set a benchmark of 50% response rate for higher level management research. A cumulative majority 25(64.1%) had worked for at least 3 years in their respective organizations. Majority of the respondents 24(61.5%) were graduates with another 10(25.6%) having post graduate qualification while only 5(12.8%) had diploma qualification. Further, majority of the study participants 28(71.8%) had engineering training while 4(10.3%) had training in administration.

#### B. Completion of PPP Projects

In this study, the dependent variable was completion of public private partnership projects, a case of Sondu-Miriu hydroelectric power project. The dependent variable was measured using 6 items scored from 1 to 5 showing increasing level of agreement from strongly disagreeing to strongly agreeing with the middle score of 3 corresponding to neutral view. Descriptively, frequency, mean and standard deviation were computed (see Table I).

TABLE I: COMPLETION OF PPP PROJECTS

| Statement   | SD    | D     | N     | A     | SA    | Mean±SD      |
|---|-------|-------|-------|-------|-------|--------------|
| I am satisfied with the overall outcome of the project                                | 2     | 1     | 5     | 17    | 14    | 4.03±1.04    |
| I am satisfied with the quality of the work   | 3     | 2     | 6     | 15    | 13    | 3.85±1.18    |
| The project was completed within a reasonable timeframe                               | 17    | 10    | 3     | 5     | 4     | 2.21±1.40    |
| During the work, there were no potential safety hazards that were not addressed       | 43.6% | 25.6% | 7.7%  | 12.8% | 10.3% | 2.21±1.40    |
| The construction project was completed without unnecessary interruption               | 6     | 8     | 4     | 10    | 11    | 3.31±1.47    |
| The construction project was completed in strict adherence to the safety requirements | 10    | 16    | 7     | 2     | 4     | 2.33±1.22    |
| The construction project was completed in strict adherence to the safety requirements | 25.6% | 41.0% | 17.9% | 5.1%  | 10.3% | 2.41±1.35    |
| Composite Mean ± Standard Deviation   | 12    | 13    | 4     | 6     | 4     | 3.021± 0.810 |
|   | 30.8% | 33.3% | 10.3% | 15.4% | 10.3% |              |

The study found that the participants were satisfied with the overall outcome of the project (Mean = 4.03±1.04) where majority of the respondents 17(43.6%) agreed with the statement with another 14(35.9%) strongly agreeing. Cumulatively, 31(79.5%) of the respondents agreed that they were satisfied with the overall outcome of the project. Thus, in terms of completion of construction project, the outcome was satisfactory to a larger extent as indicated by the respondents who were also the key participants in the project. These findings correspond to those of [16] noted that most important performance indicators for evaluating project performance were quality of finished project, construction cost and construction time.

Similarly, the project participants were satisfied with the quality of the work (Mean = 3.85±1.18). Majority of the respondents 15(38.5%) agreed that they were satisfied with the quality of the work with another 13(33.3%) strongly agreeing. Although 5(12.8%) of the respondents cumulatively disagreed that they were satisfied with the quality of the work, the overall opinion indicated satisfaction with the quality of work in the project. However, the study found that the project was not completed within the expected timeframe (Mean = 2.21±1.40). Specifically, majority of the study participants 17(43.6%) strongly disagreed that the project was completed within a reasonable timeframe with another 10(25.6%) disagreeing. This finding shows that there were general delays in completion of works which led to failure to complete the works in time.

Similarly, the study found that there were unnecessary delays in project execution (Mean = 2.33±1.22). In this case 41.0% of participants disagreed that the construction project was completed without unnecessary interruption while

10(25.6%) strongly disagreed. Thus, 13(66.6%) of the respondents disagreed that there were delays in the construction work which ultimately affected the completion of the construction work. Similarly, [17] found that amalgamation of tasks and responsibilities in mega projects reduces costs. The findings further show that the construction project was not completed in strict adherence to safety requirements (Mean = 2.41±1.35). Majority of respondents 13(33.3%) disagreed while 12(30.8%) strongly disagreed. This shows that a cumulative 25(64.1%) of respondents consider that work was not completed in strict adherence to safety requirements.

In terms of risk hazards and injuries, there was an average view that there were no potential safety hazards that were not addressed (Mean = 3.31±1.47). This emerged as majority of respondents 21(53.8%) cumulatively agreed that there were no potential safety hazards that were not addressed. The finding shows that there are significant potential safety hazards which emerged during the construction project. To corroborate this, [18] also explains that occurrence of risk is inevitable in construction works such that even PPP projects are not an exception calling for stakeholders visualize and respond to emerging complexities.

### C. Construction time overrun related risks and completion of PPP projects

Construction time overrun was measured using 10 items scored from 1 to 5 showing increasing level of agreement from strongly disagreeing to strongly agreeing with the middle score of 3 corresponding to neutral view. Descriptively, frequency, mean and standard deviation were computed (see Table II).

TABLE II: CONSTRUCTION TIME OVERRUN RELATED RISKS AND COMPLETION OF PPPS

| Statements   | SD          | D           | N           | A           | SA          | Mean ± SD    |
|--|-------------|-------------|-------------|-------------|-------------|--------------|
| Supervisory practices during project work led to delays in project completion                            | 16<br>41.0% | 12<br>30.8% | 7<br>17.9%  | 3<br>7.7%   | 1<br>2.6%   | 2.00±1.08    |
| The project work plan was not adequate.  | 11<br>28.2% | 14<br>35.9% | 8<br>20.5%  | 4<br>10.3%  | 2<br>5.1%   | 2.28±1.15    |
| There were delays in delivery of materials and equipment which affected the completion of the project    | 2<br>5.1%   | 3<br>7.7%   | 5<br>12.8%  | 12<br>30.8% | 17<br>43.6% | 4.00±1.17    |
| There were schedule delay during project construction as a result of inadequate planning                 | 4<br>10.3%  | 5<br>12.8%  | 4<br>10.3%  | 16<br>41.0% | 10<br>25.6% | 3.59±1.29    |
| Design changes interfered with construction project schedule   | 3<br>7.7%   | 1<br>2.6%   | 7<br>17.9%  | 17<br>43.6% | 11<br>28.2% | 3.82±1.12    |
| Design process took longer than anticipated and this affected the time scheduled for project completion. | 3<br>7.7%   | 4<br>10.3%  | 4<br>10.3%  | 13<br>33.3% | 15<br>38.5% | 3.85±1.27    |
| Delays in resolving disputes interfered with construction schedule                                       | 1<br>2.6%   | 2<br>5.1%   | 4<br>10.3%  | 20<br>51.3% | 12<br>30.8% | 4.03±0.93    |
| Delay in preparation and approval of drawings interfered with construction schedule                      | 0<br>0.0%   | 16<br>41.0% | 23<br>59.0% | 0<br>0.0%   | 0<br>0.0%   | 2.59±0.50    |
| Incomplete designs lead to delays in commencement and completion of various sections of the project      | 6<br>15.4%  | 9<br>23.1%  | 18<br>46.2% | 6<br>15.4%  | 0<br>0.0%   | 2.62±0.94    |
| There were Scheduling errors which led to contractor delays  | 0<br>0.0%   | 21<br>53.8% | 11<br>28.2% | 7<br>17.9%  | 0<br>0.0%   | 2.64±0.78    |
| Composite Mean ± Standard Deviation  |             |             |             |             |             | 3.141± 0.785 |

Delays occurring in the case project completion were not due to supervisory practices. Specifically, 16(41.0%) of the respondents strongly disagreed with the statement while

12(30.8%) disagreed. This gives a total of 28(71.8%) of respondents who believe that delay in construction of the project were not due to supervisory practices. However,

7(17.9%) of the respondents were neutral regarding the statement that supervisory practices during project work led to delays in project completion with 3(7.7%) agreeing while 1(2.6%) strongly agreeing. Thus, the supervisory practices during project work did not lead to delays in project completion (Mean = 2.00±1.08). The overall mean for this item was lower than the composite mean (Mean = 3.141±0.785) indicating that supervisory practices was not a significant delay factor. This shows that there were noticeable delays attributable to supervisory practices during the project although this was not significant. This opinion was shared by managers who were interviewed during the study who provided explanation regarding the nature of delays. One of the managers said that:

*“Community agitation led to stalling of the project since the community did not initially embrace the project. Consequently, the community was setting high demands to be met in terms of compensation and integration of community members to benefit from the project through supplies to the project and employment opportunities. [Project Manager, Sondu Miriu Hydropower Project].”*

Similarly, the study found that the project work plan was adequate contrary to expectation that the plan was inadequate (Mean = 2.28±1.15). Compared against the composite mean of 3.141 (SD = 0.785), work plan was not a contributing factor in delays in completion as it had little effect. This was revealed as the overall response to the statement that the project work plan was not adequate, was a disagreement. Specifically, majority of the participants 14(35.9%) disagreed while 11(28.2%) strongly disagreed for a cumulative total of 25(64.1%) who disagreed. However, there was a considerable 6(15.4%) who cumulatively agreed that the project work plan was not adequate. Further, 8(20.5%) of the respondents were neutral thus undecided as to whether project plans were inadequate or not. This shows that although project plans did not cause noticeable delays in completion, they were not that perfect thus leaving doubt into the minds of some of the project participants.

The study found that delays in delivery of materials and equipment affected the completion of the project (Mean = 4.00±1.17). Compared to the composite mean of 3.141 (Std. Dev. = 0.785), loss of time during acquisition and delivery of work equipment and requisite materials was predominant and affected completion. This view was pointed out by 17(43.6%) participants strongly agreed that there were delays in material delivery affecting completion with another 12(30.8%) agreeing. This shows that, among the project participants, delay in delivery of construction materials had a significant effect in the completion of the projects as reported by a cumulative 29(74.4%) of the study respondents. However, 5(12.8%) of the respondents cumulatively disagreed that the delay in delivery of materials affected the completion of the project while 4(10.3%) were neutral regarding this statement. These respondents considered the delays to be minimal hence with little effect on the completion of the project.

The study further found that there were schedule delays during project construction as a result of inadequate planning (Mean = 3.59±1.29) which affected the completion of the construction project. Based on the findings, majority of the participants 16(41.0%) agreed that there were schedule delays while another 10(25.6%) strongly agreed. This shows that at least two thirds 26(66.7%) admit that there were schedule delays which ultimately affected completion of the construction of Sondu – Miriu Hydropower project. Although 4(10.3% strongly disagreed while 5(12.8%) disagreed with this statement, the overall opinion points to the conclusion that there were schedule delays during the project construction as a result of inadequate planning. These findings agree with those of [8] who showed that inappropriate skills, changing costs of materials, delays and scope adjustments contribute to massive time overrun.

As for the design changes, the study found that design changes interfered with construction project schedule (Mean = 3.82±1.12). Compared to the composite mean (Mean = 3.141±0.785), design changes during implementation of the project was frequent that it highly affected the completion of the project. The effect of design changes on the completion of the construction project was observed by majority of the study respondents 17(43.6%) who agreed with the statement while another 11(28.2%) strongly agreed. Cumulatively, 28(71.8%) of the respondents agreed that design changes during the construction project interfered with the project schedule and thus, completion. Of the remaining 11(28.2%), 4(10.3%) cumulatively disagreed that design changes interfered with construction project schedule while 7(17.9%) were neutral. This might be due to the fact that changes did not occur in the sections where these study participants were involved. The findings are concurrent to those of Ismail (2014) who found that there a dozen factors contributing to time overrun attributable to management, scheduling, incompetence and scope changes.

Similarly, the study found that the actual design process took longer than anticipated and this affected the time scheduled for project completion (Mean = 3.85±1.27) with a higher mean score than the composite mean (Mean = 3.141±0.785) showing the prolonged design process affected the completion of the project based on the original time schedules. This shows that protracted design period affected the scheduled completion time from the perspective of various stakeholders. Specifically, majority of the study respondents 15(38.5%) strongly agreed that design process took longer than anticipated and this affected the time scheduled for project completion while 13(33.3%) of the respondents agreed. This gave an overall 71.8% of the respondents who acknowledged the design process took longer thus affecting the overall timelines. However, 7(18.0%) of the respondents cumulatively disagreed that design process took longer than anticipated and this affected the time scheduled for project completion while 4(10.3%) were neutral. This divergent view could be attributed to participants who were involved in the project after the design stage. On the contrary, [16] observed that delays and failure to deliver project phases affects the



overall project delivery hence a significant factor in the completion of PPPs.

However, the study found that delays in resolving disputes interfered with construction schedule to a greater extent (Mean = 4.03±0.93) showing that dispute resolution was a greater challenge to completion of the project. From the responses of the study participants, majority 20(51.3%) agreed that the delays in resolving disputes among stakeholders interfered with the construction schedule while another 12(30.8%) strongly agreed giving a total of 32(82.1%) of the respondents who agreed that, indeed, delays in resolving disputes interfered with the construction schedule. Of the remaining 7(18%), 3(7.7%) cumulatively disagreed while the other 4(10.3%) were neutral as to whether delays in resolving disputes interfered with the construction schedule. The divergent view could be due to participants who were never in conflict or in minimal conflict during the construction period. The study also found that the extent to which delay design development and approval is a recipe for time overrun to a low extent (Mean = 2.59±0.50). The findings show that majority of the respondents 23(59.0%) were undecided and thus neutral while another 16(41%) outrightly disagreed regarding the statement. This shows that there were minimal delays in design approval thus did not interfere much with scheduling of activities in the construction project and eventual completion.

Similarly, the study found that incomplete designs were not a cause for delays in commencement and completion of various sections of the project (Mean = 2.62±0.94). Given that the composite mean (Mean = 3.141± 0.785) was higher than the item mean, there were minimal cases of incomplete designs delaying the commencement and completion of various sections of the project. Based on this statement 15(38.5%) of the respondents cumulatively disagreed out of which 6(15.4%) strongly disagreed. However, majority 18(46.2%) were neutral regarding the statement an indication that incomplete designs either did not cause delays or caused delays in the completion of various sections of the project. The findings are supported by those of [19] who found that the major causes of delay were material shortage, cost variation and arbitration aspects.

Further, the study found that scheduling errors were not the cause for contractor delays as the respondents generally disagreed with the statement that there were Scheduling errors which led to contractor delays (Mean=2.64±0.78). Majority of participants in Sondu-Miriu Hydropower project 21(53.8%) disagreed that there were Scheduling errors which led to contractor delays. However, 7(17.9%) agreed that there were Scheduling errors which led to contractor delays. Significantly though, 11(28.2%) of the respondents were neutral as to whether there were Scheduling errors which led to contractor delays. This shows that these respondents might have noticed the scheduling delays but did not perceive them as being able to cause contractor delays. These findings show that there were errors in scheduling leading to contractor delays although such did not affect the completion of the project to a greater extent.

The managers attributed scheduling errors during the project to financing structure which meant that funds were availed late for the aspects of the project. Specifically, one manager said that:

*“Financing structure of the project led to delays in accomplishing scheduled tasks. This emerged as money for various project phases were remitted way past the scheduled time. The materials and labour could not be paid for in time leading to overall delay in the completion of the project. [Project Manager, Sondu Miriu Hydropower Project]”*

In order to determine the relationship between construction time overrun related risks and completion of Sondu- Miriu Hydropower project, a correlation analysis was run with item scores summated to produce continuous scale data. Time overrun related risks had significant contribution on completion of the project (R = -.975; (p <.001; p < 0.05) (see Table III). This implies that it can be statistically shown that as construction time overrun increases, completion declines significantly. With the strong negative correlation, time overrun related risks have a greater negative effect on completion of PPP projects. This stems from the premise that time overrun emanates from delays at various stages and components of project. The delay and pressure that emerges may also lead to compromise in project deliverables quality.

TABLE III: CORRELATION OUTPUT FOR TIME OVERRUN RISKS AND COMPLETION OF PPP PROJECTS

| Variables                              |                     | Construction time overrun related risks | Completion of construction project |
|--|---------------------|---|------------------------------------|
| Construction time overrun related risk | Pearson Correlation | 1                                       | -0.975**                           |
|  | Sig. (2-tailed)     |   | 0.000                              |
|  | n                   | 39                                      | 39                                 |
| Completion of construction project     | Pearson Correlation | -0.975**                                | 1                                  |
|  | Sig. (2-tailed)     | 0.000                                   |                                    |
|  | n                   | 39                                      | 39                                 |

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Using regression (see Table IV), it was found that construction time overrun accounts for 95.1% (R square = .951) of effective completion in mega construction projects with the model being significant with F (1, 37) = 717.7 [p < .001; p < .05]. Consequently, the relationship between variables is presented as per the function:

$$Y = B_0 + B_1X_1 + \epsilon$$

In this case, Y is the aspect of completion and X<sub>1</sub> is risks and B<sub>0</sub> and B<sub>1</sub>, the unstandardized coefficients while ε is the model error. When we bring in the coefficients as determined from regression we obtain:

$$Y = 38.95 - 0.663X_1$$

TABLE IV: REGRESSION OUTPUT

| Model | R                                      | R Square                    | Adjusted R Square         | Std. Error of the Estimate |       |       |
|-------|--|-----------------------------|---------------------------|----------------------------|-------|-------|
| 1     | 0.975 <sup>a</sup>                     | 0.951                       | 0.950                     | 0.560                      |       |       |
| Model |  | Unstandardized Coefficients | Standardized Coefficients | t                          | Sig.  |       |
|       |  | B                           | Beta                      |                            |       |       |
|       | (Constant)                             | 38.95                       | 0.782                     | 49.78                      | 0.000 |       |
| 1     | Construction time overrun related risk | -0.663                      | 0.025                     | -0.975                     | 26.79 | 0.000 |

a. Dependent Variable: Completion of construction project

b. Predictors: (Constant), Construction time overrun

This shows that, when construction time overruns related risks changes by one positive unit, completion of construction project declines by 0.663. Thus, construction time overrun related risks negatively affect completion of construction of PPPs to a magnitude of 0.663 as indicated by the main effects. On its own, when time overrun related risks are considered in completion of construction of PPP projects, they have a significantly greater effect of delaying the project.

The null hypothesis tested at 95% confidence level. The hypothesis was stated as:

*H<sub>0</sub>: Time overrun related risk does not significantly influence completion of PPP projects.*

Since there was a strong negative correlation between the variables,  $r(38) = -0.975$  ( $p < .05$ ) with regression showing that construction time overrun related risks explained up to 95.1% [R square = .951,  $F(1, 37) = 717.7$ ;  $p < .05$ ]. This implies that construction time overrun related risks significantly influence completion. Therefore, we reject the null hypothesis that *Time overrun related risk does not significantly influence completion*. This is because time overrun in construction projects affects project schedules and timelines leading to increased costs which affect the overall project budget.

## V. CONCLUSIONS

The study concludes that supervisory practices during project work do not lead to delays in project completion when the project work plan is adequate. Further, the study concludes that preparation and approval of drawings interfere with construction schedule to low extent just as do incomplete designs while scheduling errors are not the cause for contractor delays. The study also concludes that delays in resolving disputes interfere with construction schedule to a greater extent while delays in delivery of materials are minimal and with little effect on the completion of the project. However, there were schedule delays which ultimately affected completion of the construction of Sondu – Miriu Hydropower project which emanate from design changes during construction as well as protracted design period which affects the scheduled completion time. Overall, the study concludes that construction time overrun significantly influences completion of construction projects through PPPs such that as construction time overrun increases, completion of PPP projects declines significantly.

## VI. RECOMMENDATION

The study recommends that stakeholders in PPPs should come together at initial stages to ensure that project drawings are made and approved in time to facilitate speedy execution of the overall project and avoid unnecessary design changes by involving all stakeholders to reduce time overrun. Similarly, dispute resolution channel should be clearly defined to address emerging disputes between the stakeholders to avoid protracted court cases which delay project execution and result in time overrun.

## VII. LIMITATIONS

The findings of this study are based entirely on information provided by respondents which in some cases maybe biased. Further information was collected after completion of the project thus relying on recall ability of the respondents which might have a negative effect on accuracy of information provided. The study also collected information from a sample of the target population thus leaving out some potential respondents.

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