



## Assessment of Time and Cost Overrun of Province Level Construction Project in Tanahun, Gandaki Province, Nepal

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*Received: November 25, 2025; Revised: 27 January, 2026; Accepted: March 21, 2026*

### Abstract

The most prevalent issues that have a significant negative influence on the project and the parties involved are time and cost overrun. In Nepal, the construction industry is frequently facing various problems, including cost, quality and time. The study's primary objective is to identify the main causes contributing to time and cost overrun in execution of construction Project. The study includes detail on the completed multiyear province level construction projects that were implemented in Tanahun district from fiscal year FY 2075/76 - FY 2079/80 through National Competitive Bidding (NCB) to analyze time and cost overrun. Also, a review of the literature was done to determine the 78 causes of time and cost overrun and the 17-mitigation measure of those time and cost overrun. Technical client representatives, consultants, and contractors were surveyed using a questionnaire to get their opinions on the causes and mitigation measures. Based on the responses of 71 respondents five most significant causes of time and cost overrun according to the Relative Importance Index (RII) and focus group discussion were: 1) Poor controlling of sub-contractor(s) by the contractor, 2) Improper technical studies by the contractor during the bidding stage, 3) Poor communications and misunderstanding, 4) Low bidding of contract, 5) Unavailability of construction material testing lab. Five main mitigation measure for time and cost overrun were: 1) Selecting a consultant who has sufficient experiences in similar nature of works and has good reputation, 2) Develop competent teams for executing works, 3) Effective planning and scheduling, 4) Select experienced and capable subcontractors, 5) Development of a proper system of site management and supervision. Among 15 multiyear construction projects of Tanahun district undertaken under NCB, 11 projects (80.00%) experienced time overrun. Time overrun range from 21.21% % to 304.38%. Risti khola bridge (Sotibesi) of 21.21% % due to omission of quantity in original BOQ and Roadway Upgrading Works along Kalimati Dudhekuna Manechauka experienced the highest cost overrun of 304.38% due to the COVID- 19, monsoon, lack of budget and site possession. Also, five of them experienced the cost overrun and among them Risti khola bridge (Sotibesi) faced the highest cost overrun of 11.58% due to additional work and omission of quantity in original BOQ. Analysis of result shows that collective effort between all parties is required to reduce delay. Therefore, separate recommendations are provided to clients, consultants and contractors.

**Keywords:** *Construction, Mitigation, Overrun, National Competitive Bidding (NCB)*

## 1. Introduction

Project overrun because of time and cost is the reason for the delay in the completion and execution of the country. In context to the Construction Industry, delay can be related with the extension of time for the completion of the project. Time overrun is a common concern in most construction projects resulting in various claims and disputes among construction parties involved in the project and cost overrun is one of the major impacts of time overrun in a project.

The construction industry is one of the largest businesses in the world and the business is an indicator of the development of a country. In developing countries like Nepal, the construction industry provides a significant number of employments and has a considerable contribution to the GDP of the country. Nepalese construction industry contributes around 10 to 11 percent to the national GDP and it uses around 35 percent of the government budget. It is also estimated that the construction sector is creating employment opportunities for about ten lakh people and is next to the agricultural sector in terms of employment generation. Construction industry has emerged as an important part of the development sector of Nepal as almost all the infrastructure development projects rely somehow on construction activities (Yadav and Mishra, 2019).

According to Rajakumar A C (2016), cost and time overruns are common in developing countries and impacts more for developing country than developed once. In context of Nepal majority of construction projects procured through various methods are facing delays in completion and have affected the construction parties and stakeholders to different extents. The reconstruction of Dharahara was intended to be complete within 24 months according to the contract agreement but until its inauguration on 24 April 2021, the physical progress had only reached about sixty percent. Dharahara Reconstruction Project's Manager requested time extension of additional twenty-one months to complete the remaining construction work, but the National Reconstruction Authority (NRA) only allowed eight additional months (Bolpatra; RSS, Kathmandu, April 19 2021).

Delay in construction projects not only affects the construction industry, but also the overall economy of a nation. Thus, delay study of construction projects under management of all levels of governments is important to determine the necessary measures to lessen the impacts of delay. Time overrun is a multifaceted issue that arises due to a combination of factors. These factors can range from inadequate project planning and coordination to unforeseen circumstances and external influences. Regardless of the specific industry or project type, time overruns can result in numerous adverse consequences. These consequences include increased costs, financial losses, decreased stakeholder satisfaction, missed market opportunities, and damaged reputations. The extension of time clause is commonly found in various types of contracts, including construction contracts, service agreements, and software development contracts. It allows the contractor or service provider to request an extension of the project timeline under certain specified conditions, typically related to delays caused by various factors.

Only a few projects have been completed within the allocated time frame and budget among numerous construction projects undertaken by the Government. Other projects have been facing various types of construction and implementation problems at different stages. Hence, this research aims to find out causes and mitigation measure of time and cost overrun so that the construction entrepreneurs as well as implementing bodies will be more aware and informed about the consequences of the delayed projects and can adopt preventive and corrective measures accordingly. To minimize the construction delay, it is very important to identify factors causing time and cost overrun. The study will provide guidance to all the practitioners involved in construction works at the province level to improve their managerial and administrative performance to

achieve the objectives of projects. Additionally, only procurements through NCB are considered for the study since the number of construction works implemented through user committees is generally large and beyond the scope of this study.

The general objective of this study is to assess time and cost overrun of province level construction project in Tanahun, Gandaki Province, Nepal

The other specific objectives of the study are as follows:

- i. To identify the main causes contributing to time and cost overrun in execution of Province level multiyear construction Project in Tanahun district.
- ii. To analyze the extent of time and cost overrun in Province level multi-year construction Project in Tanahun district.
- iii. To evaluate the mitigation measures can be proposed to reduce the occurrence of time and cost overrun in Province level multi-year construction Project in Tanahun district.

## 2. Study Area

The study area is Tanahun district, a part of Gandaki Province, one of the seventy-seven districts of Nepal. The district, with Damauli (a small town) as its district headquarters, covers an area of 1,546 km<sup>2</sup> and had a population of 321,153. It lies in the hilly region at an altitude ranging from 3,300 to 6,600 ft. It lies at about latitude 27.9447° North and longitude 84.2279° east. The district now has four municipalities namely Vyas, Suklagandaki, Bhanu, Bhimad and six village councils Devghat, Aabukhaireni, Bandipur, Mygde, Rishing, Ghiring.

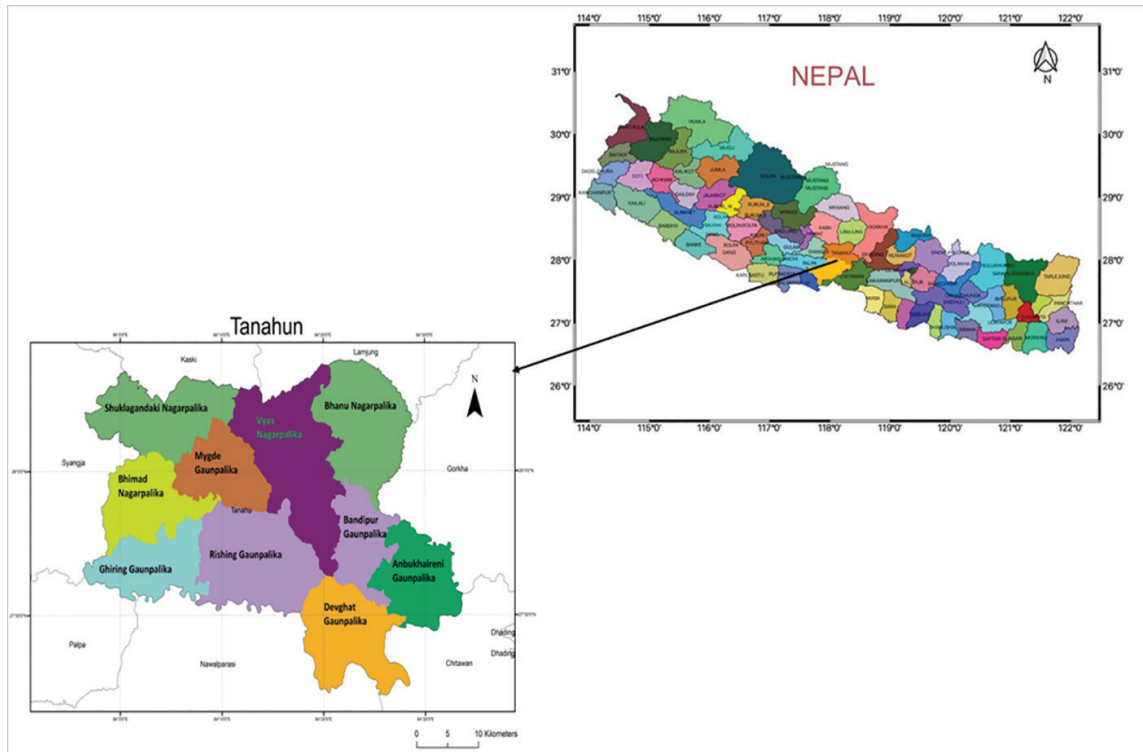


Figure 1: Study Area

### 3. Materials and Methods

The research methodology chosen for this study consisted of intensive literature review, multiple forms, and mail questionnaires provided to construction stakeholders in Infrastructure Development Office, Tanahun followed by a statistical analysis of the survey. Research is conducted through qualitative and quantitative analysis. The research was designed to get opinions from clients, consultants and contractors of construction companies in regards to the factors affecting time and cost overrun and their remedial measure. Questionnaire survey was prepared and is being used to collect primary data. Secondary data consist of progress reports, documents and records maintained by clients and contractors, different research papers, thesis, journals and publications.

The proposed framework of research methodology is shown in figure below:

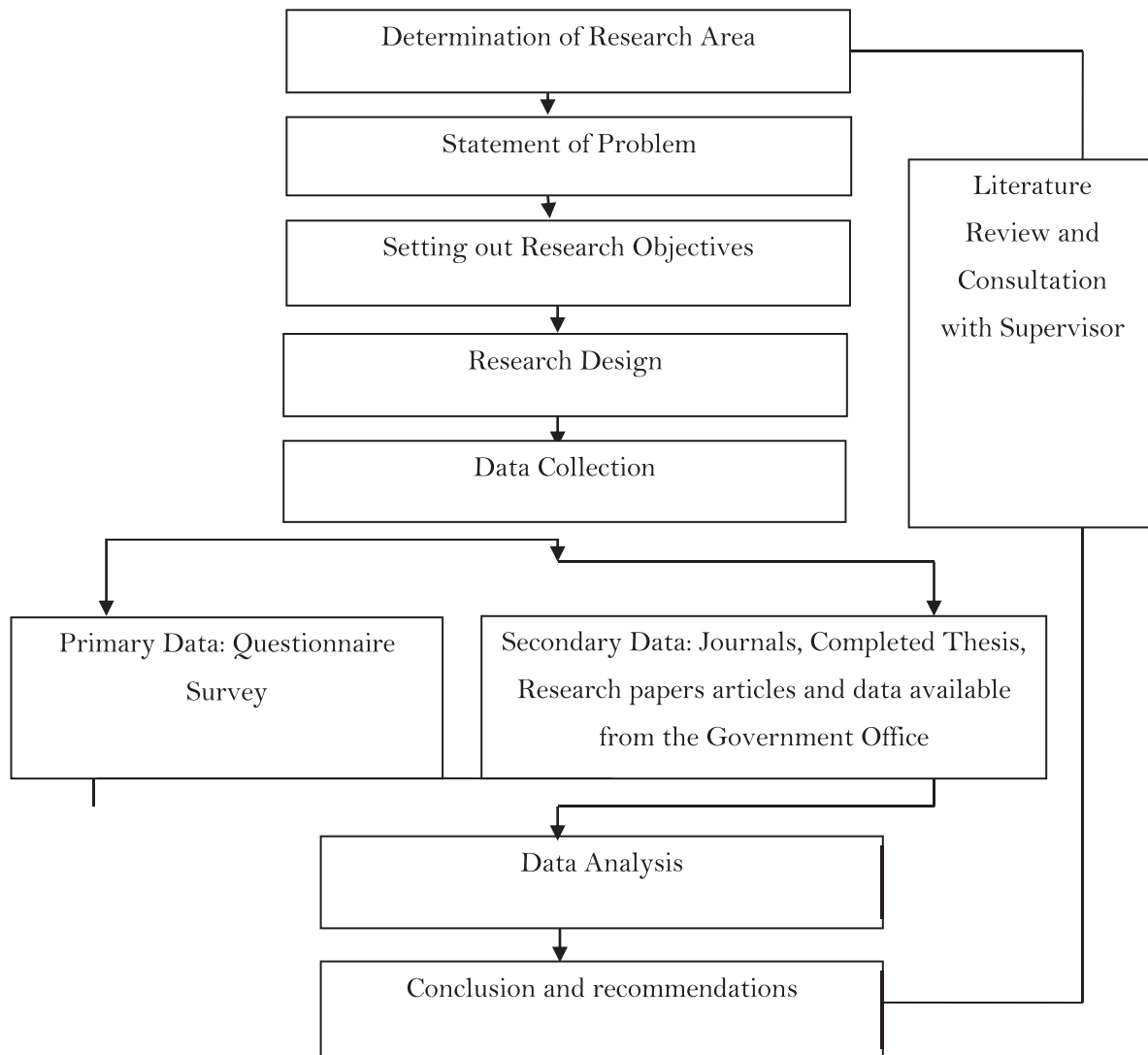


Figure 2: Structure Research Methodology

### 3.1 Study Population and Sample Size

The study required collection of various data related to multiyear province level multiyear construction works implemented by Gandaki Province in Tanahun district through Competitive Bidding (NCB) method to assessment of causes and mitigation measure of time and cost overrun. Project related primary data are being collected through questionnaire surveys finalized through interview and discussion for the identification of causes and mitigation measure of time and cost overrun. Survey population is being taken as engineers and junior engineers from government office, director; project engineer from the contractor side and consultants involved in different multiyear construction project implemented by Gandaki Province in Tanahun district. The total number of populations for the study is illustrated in Table 1.

**Table 1:** Population and Sample of clients, contractors and consultants

S.N.	Organization/ Position	Total Population
1	Client's (Engineer/Junior Engineer)	28
2	Contractor's Technical Representatives	36
3	Consultant's Technical Representatives	14
	<b>Total</b>	<b>78</b>

(Survey, 2023 A.D.)

The population as was found small, so that sample size is equal to population size. Whole population was taken for questionnaire survey. Representatives of clients, contractors, and consultants were 30, 40, and 15 of the total population, respectively. The targeted sample size, total respondents, and the proportion of replies from each construction party contacted for the response that were taken for further analysis are shown in Table 2.

**Table 2:** Target for Questionnaire Survey

S.N.	Description	Target for study	Respondents	Respondents Percentage
1	Client's (Engineer/Junior Engineer)	28	25	89.28%
2	Contractor (Technical Representatives)	36	34	94.44%
3	Consultant (Technical Representatives)	14	12	85.71%
	<b>Total</b>	<b>78</b>	<b>71</b>	<b>91.02%</b>

(Survey, 2023 A.D.)

### 3.2 Method of Data Collection

All data required for the study will be collected through primary and secondary data collection methods.

#### 3.2.1 Primary Data collection

Primary data for the study is being gathered through questionnaire surveys given to consultants, client's representatives, and contractor's representatives involved in construction projects of Infrastructure Development Office, Tanahun.

A questionnaire survey is being conducted to assessment of causes and remedial measure of time and cost overrun which will finalized through literature review and discussion with a few contractors, engineers and consultants. The questionnaire consists of classified sections:

- i. Section A: Respondent Background
- ii. Section B: Causes of Construction Time and Cost Overrun
- iii. Section C: Mitigation Measure

### 3.2.2 Secondary Data Collection

Various national and international research papers, theses, journals, the Public Procurement Act-2063, the Public Procurement Regulation-2064, and numerous academic publications and construction project documents provide by Infrastructure Development Office, Tanahun were used to gather the secondary data and information.

## 3.3 Data Analysis

In order to collect data from questionnaire surveys, Likert's Scale will be used, and respondents will ask to determine the level of relevance based on their own viewpoints. The questionnaires were based on the following five-point scale, which ranged from 1 to 5:

- 1 = Strongly Disagree (SD)
- 2= Disagree (D)
- 3= Moderate (M)
- 4= Agree (A)
- 5= Strongly Agree (SA)

### 3.3.1 Relative Importance Factors

The Relative Importance Index (RII) method is used to determine the relative importance of causes of delays and the effects of delay for this study. The five-point scale ranged from 1 (Strongly Disagree) to 5 (Strongly Agree) was adopted and transformed to RII for each factor as follows:

$$RII = \frac{\sum W}{A*N} \dots\dots\dots 1$$

Where, W is the weight given to each of the factors by the respondents (ranging from 1 to 5), A, is the highest weight (i.e. 5 in this case), and N is the total number of respondents.

The RII value ranges from 0 to 1, higher the value of RII, more important is cause or effect of delays. Ranking was set according to increasing value of RII; an increase in the value indicates increase in significance level. These rankings make it possible to cross-compare the relative importance of the factors as perceived by the three groups of respondents (i.e. clients, consultants and contractors). Each individual cause's RII perceived by all respondents will be used to assess the general and overall rankings in order to give an overall picture of the causes of construction delays in rural municipalities' construction works. A similar procedure will be adopted for ranking the effects. The weighted average for each item for the three groups of respondents will be determined and ranks (R) will be assigned to each item representing the perception of the three groups. According to RII values the ranks are set. For determining highly significant factors of causing delay and effect of delay a comparative table will be used as shown in Table 3.

**Table 3:** Relative Importance Index Table

S.N.	RII	Ranking
1	0.8-1	High
2	0.6-0.8	Medium
3	0.2-0.6	Low

**3.3.2 Cronbach’s alpha**

To evaluate the reliability of the five-point scale employed in the survey, Cronbach's alpha was used. Cronbach's alpha is typically thought to have a bottom limit of 0.7. Using the measurement of internal consistencies technique, all client-related, contractor-related, labor-related, material and equipment-related, and external factors were shown.

Cronbach’s alpha is calculated using the following equation:

$$\alpha = \frac{k}{k-1} \left[ 1 - \frac{\sum s_y^2}{s_x^2} \right] \dots\dots\dots 2$$

where,

k = number of test item

$\sum s_y^2$  = sum of the item variance

$S_x^2$  = the variance of total Score

Table 4 shows the interpretation of the value of Cronbach’s alpha. Table 4-11 shows the details of calculation of Cronbach’s alpha for different categories of delay.

**Table 4:** Interpretation of Alpha for Likert Scale Question

S.N.	Cronbach’s Alpha ( $\alpha$ )	Internal Consistency
1	0.9 and above	Excellent
2	0.8-0.89	Good
3	0.7-0.79	Acceptable
4	0.6-0.69	Questionable
5	0.5-0.59	Poor
6	Below 0.5	Unacceptable

**3.4 Research Matrix**

The relationship between research objectives, variables, and the kind of analysis employed to meet the goals of this study is shown by the research matrix shown in Table 5.

**Table 5:** Relation between Research objectives, Variables and Analysis

Objective	Variable	Analysis
Research and analyze time and cost overrun in construction project	Interview and discussion with contractors' representatives and clients, Literature Review and Questionnaire Survey	Qualitative and Quantitative Analysis
Perform case study on multiyear province level construction project in Tanahun, district	Literature Review Questionnaire Survey Interview	Qualitative and Quantitative Analysis

## 4. Results and Discussion

### 4.1 Construction Projects Details

Gandaki Province implement procured a number of constructions works through NCB in Tanahun district. The study incorporates details of the 15 multiyear completed construction projects at various stages of implementation from F.Y. 2076/077. To F.Y. 2079/080 under the responsibility of Tanahun district.

### 4.2 Time Overrun

Among 15 construction projects of Gandaki Province in Tanahun district undertaken under NCB, 11 projects (80.00%) faced time overrun. The details of the construction projects are shown in Table 5.

**Table 5:** Time Overrun Occurrence

S.N.	Name of Project offices	NCB Projects considered	Time Overrun Occurrence	Severity % of Time overrun
1	Tanahun, Gandaki Province	15	11	80.00%

(Survey, 2023 A.D.)

Following relation is used to calculate the Time overrun for each of the project studied:

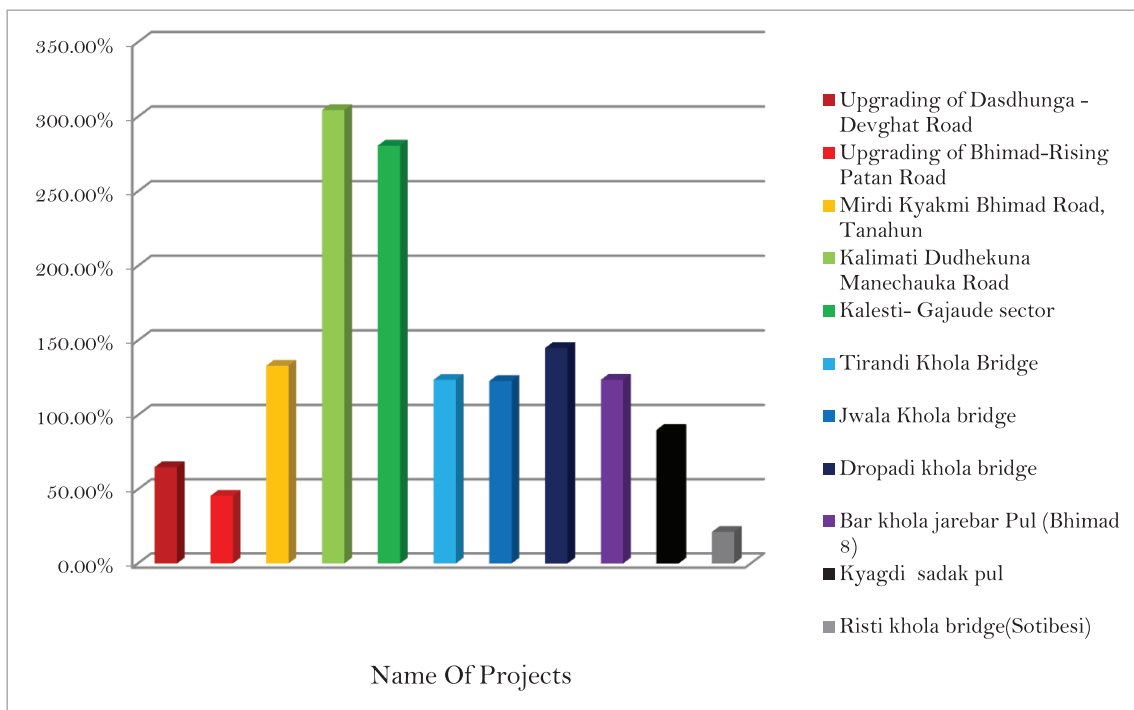
$$\text{Time Overrun} = \frac{\text{Extended Time}}{\text{Initial Contract Period}} * 100$$

(Yadav and Mishra, 2019)

Time overrun calculation presented in the Table 6 shows that In Tanahun District time overrun range from 21.21% % to 304.38%. Roadway Upgrading Works along Kalimati Dudhekuna Manechauka has the maximum time overrun of 304.38 % due to COVID- 19, monsoon, lack of budget and site possession.

**Table 6:** Projects Status based on completion time

S.N.	Name Of Projects	Initial Contract Period (Days)	Extended Time period (Days)	Time Overrun (%)
1	Upgrading of Dasdhunga - Devghat Rural Municipality Connecting Road	608	395	64.97%
2	Upgrading of Bhimad-Rising Patan Road	465	212	45.59%
3	Road Improvement and Structural Works on Mirdi Kyakmi Bhimad Road, Tanahun	424	564	133.02%
4	Roadway Upgrading Works Along Kalimati Dudhekuna Manechauka	365	1111	304.38%
5	Kalesti- Gajaude sector (0+500 to 4+000), Pansaye phant -Barkhatar sector (0+000 to 4+000)	546	1532	280.59%
6	Tirandi Khola Bridge	543	671	123.57%
7	Jwala Khola bridge	364	447	122.80%
8	Dropadi khola bridge	363	526	144.90%
9	Bar khola jarebar Pul (Bhimad 8)	364	450	123.63%
10	Kyagdi (Bhimad 8 and Suklagandaki 11) sadak pul	730	657	90.00%
11	Risti khola bridge (Sotibesi)	547	116	21.21%



**Figure 3:** Time Overrun of Construction Projects

### 4.3 Cost Overrun

Cost overrun is one of the most significant and consequential effects of time overrun in construction projects. The delay in completion of a construction project prompts increased overhead cost, underutilization of resources, and price escalation. Cost overrun is calculated for a selected construction project with the following relation:

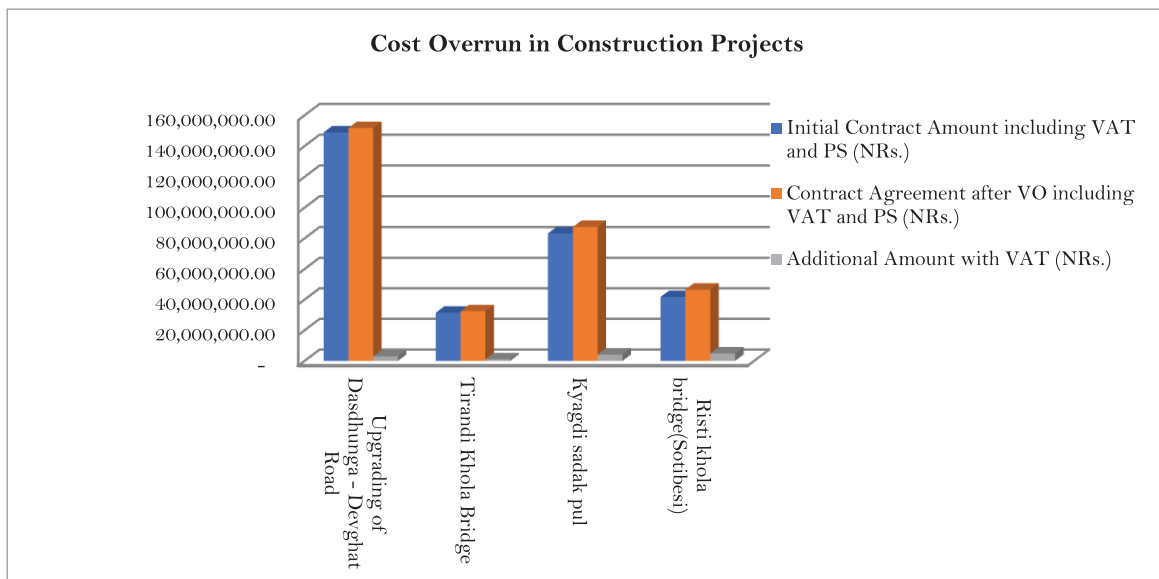
$$\text{Cost Overrun} = \frac{\text{Additional Amount}}{\text{Initial Contract Amount}} * 100$$

(Yadav and Mishra, 2019)

From the list of details of projects, seven projects entertained Variation Order (VO), and thus cost overrun was calculated for those projects only. Risti khola bridge (Sotibesi) experienced the highest cost overrun of 11.58%.

**Table 7:** Cost-overrun of Construction Projects

S. N.	Name Of Projects	Initial Contract Amount including VAT and PS (NRs.)	Contract Agreement after VO including VAT and PS (NRs.)	Additional Amount with VAT (NRs.)	Cost Overrun %
1	Upgrading of Dasdhunga - Devghat Rural Municipality Connecting Road	148,799,955.84	151704598.8	2,904,642.96	1.95%
2	Tirandi Khola Bridge	31,401,282.12	32401594.28	1,000,312.16	3.19%
3	Kyagdi (Bhimad 8 and Suklagandaki 11) sadak pul	83,248,000.00	87334430.00	4,086,430.00	4.91%
4	Risti khola bridge (Sotibesi)	41,645,840.00	46469580.00	4,823,740.00	11.58%



**Figure 4:** Cost overrun of construction Project

#### 4.4 Reliability of Research Instrument

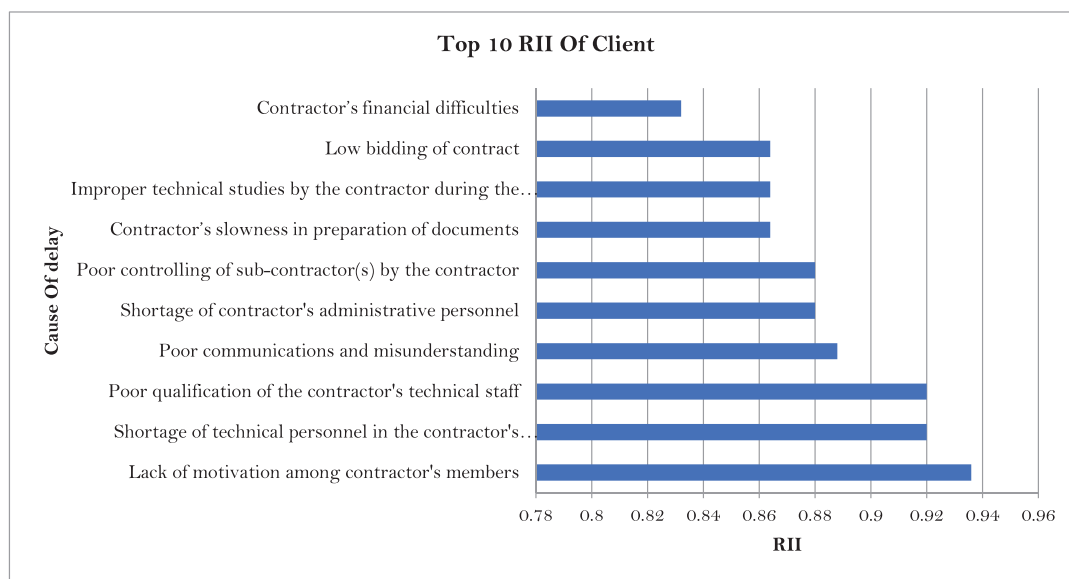
Cronbach's alpha is typically thought to have a bottom limit of 0.7. Using the measurement of internal consistencies technique, all client-related, contractor-related, labor-related, material and equipment-related, and external factors were shown to have Cronbach's alpha values larger than 0.7. These are within the acceptable range taken into account for the dependability of the research equipment.

**Table 8:** Calculation of Cronbach's Alpha

S.N.	Category	Cronbach's Alpha( $\alpha$ )	Interpretation
1	Owner Related	0.745	Acceptable
2	Contractor Related	0.805	Good
3	Consultant Related	0.701	Acceptable
4	External Factor	0.721	Acceptable

#### 4.5 Relative importance Index and Analysis

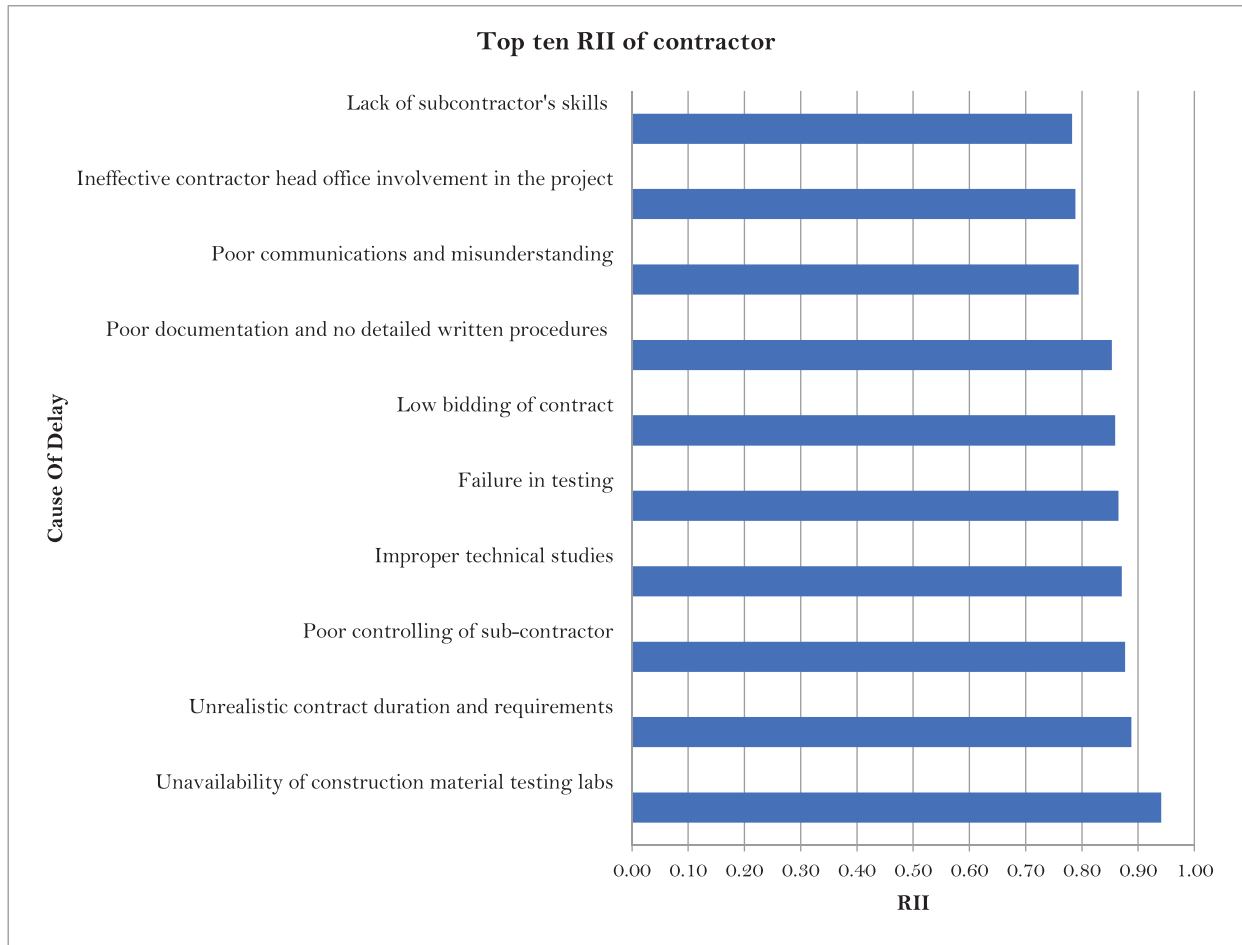
Based on a review of the literature, characteristics that were identified as time and cost overrun causes were divided into four groups. The following figures 5, 6, 7 and 8 shows Causes Related to Client, Contractor, Consultant, and External Causes respectively. Ranking each delay cause was done in order to identify the important variables contributing to the delay in the construction project. Based on the results of a questionnaire survey, the RII values were used to determine rankings. Client respondents highlight the extremely critical aspects that contribute to the delay. Top 10 caused of time and cost overrun according to client's representatives are 1) Lack of motivation among contractor's members, 2) Shortage of technical personnel in the contractor's organization 2) Poor qualification of the contractor's technical staff, 4) Poor communications and misunderstanding, 5) Shortage of contractor's administrative personnel, 5) Poor controlling of sub-contractor(s) by the contractor, 7) Contractor's slowness in preparation of documents, 8) Improper technical studies by the contractor during the bidding, 9) Low bidding of contract, 10) Contractor's financial difficulties.



(Survey, 2023 A.D.)

**Figure 5:** Top ten causes of time and cost overrun based on responses of clients

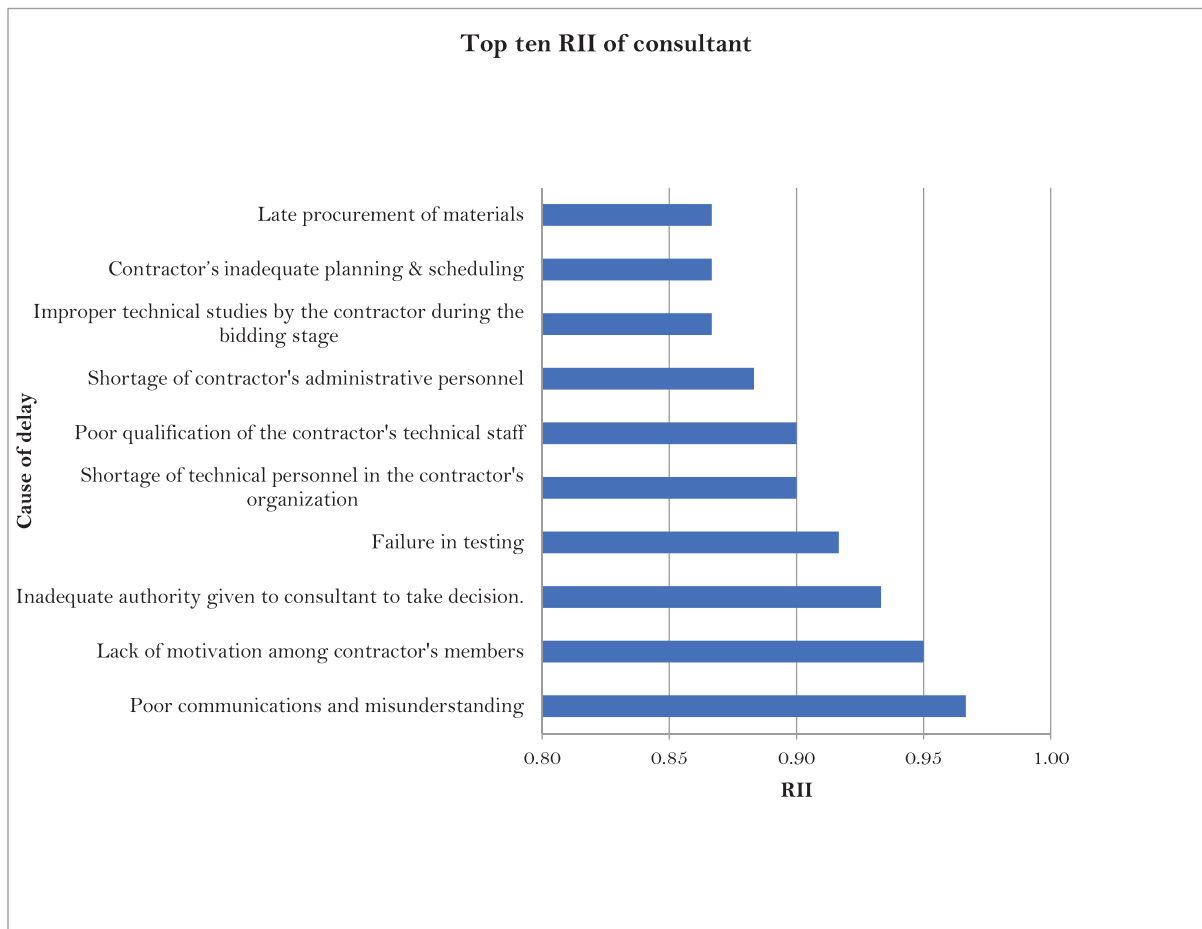
Similarly, According to the contractor's technical representatives top 10 causes of time and cost overrun are 1) Unavailability of construction material testing labs , 2) Unrealistic contract duration and requirements, 3) Poor controlling of sub-contractor(s) by the contractor, 4) Improper technical studies by the contractor during the bidding stage, 5) Failure in testing , 6) Low bidding of contract, 7) Poor documentation and no detailed written procedures, 8) Poor communications and misunderstanding, 9) Ineffective contractor head office involvement in the project, 10) Lack of subcontractor's skills



(Survey, 2023 A.D.)

**Figure 6:** Top ten causes of time and cost overrun based on responses of contractor

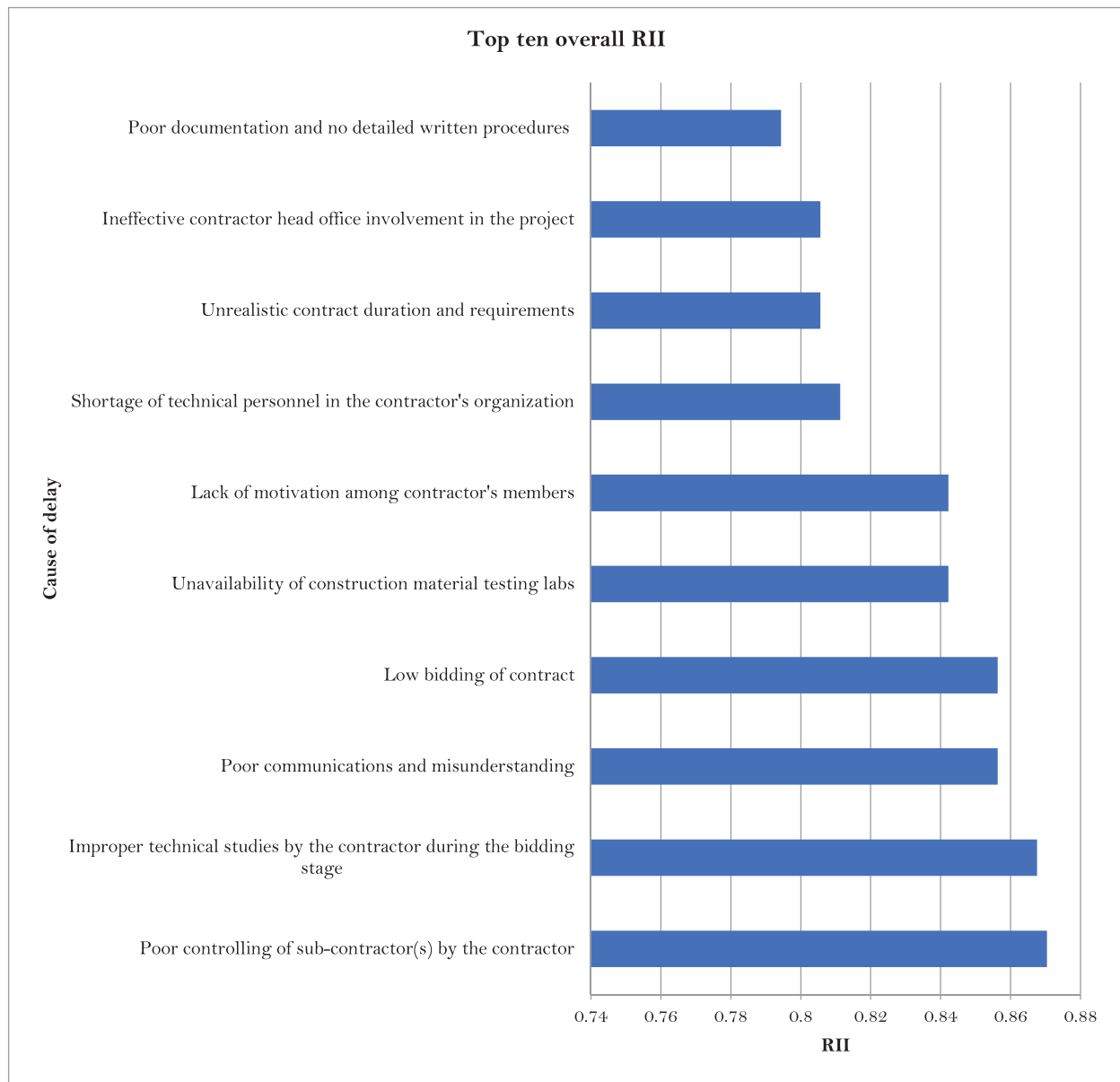
Similarly, According to the Consultants top 10 factors causing delay are 1) Poor communications and misunderstanding, 2) Lack of motivation among contractor's members, 3) Inadequate authority given to consultant to take decision, 4) Failure in testing, 5) Shortage of technical personnel in the contractor's organization, 5) Poor qualification of the contractor's technical staff 7) Shortage of contractor's administrative personnel, 8) Improper technical studies by the contractor during the bidding stage, 9) Contractor's inadequate planning & scheduling, 10) Late procurement of materials.



(Survey, 2023 A.D.)

**Figure 7:** Top ten causes of time and cost overrun based on responses of consultant

Overall ranks of factors causing delays based on the responses of clients, contractors, consultants are 1) Poor controlling of sub-contractor(s) by the contractor, 2) Improper technical studies by the contractor during the bidding stage, 3 ) Poor communications and misunderstanding, 3) Low bidding of contract, 5) Unavailability of construction material testing labs, 5) Lack of motivation among contractor's members, 7) Shortage of technical personnel in the contractor's organization, 8) Unrealistic contract duration and requirements, 8) Ineffective contractor head office involvement in the project, 10) Poor documentation and no detailed written procedures



(Survey, 2023 A.D.)

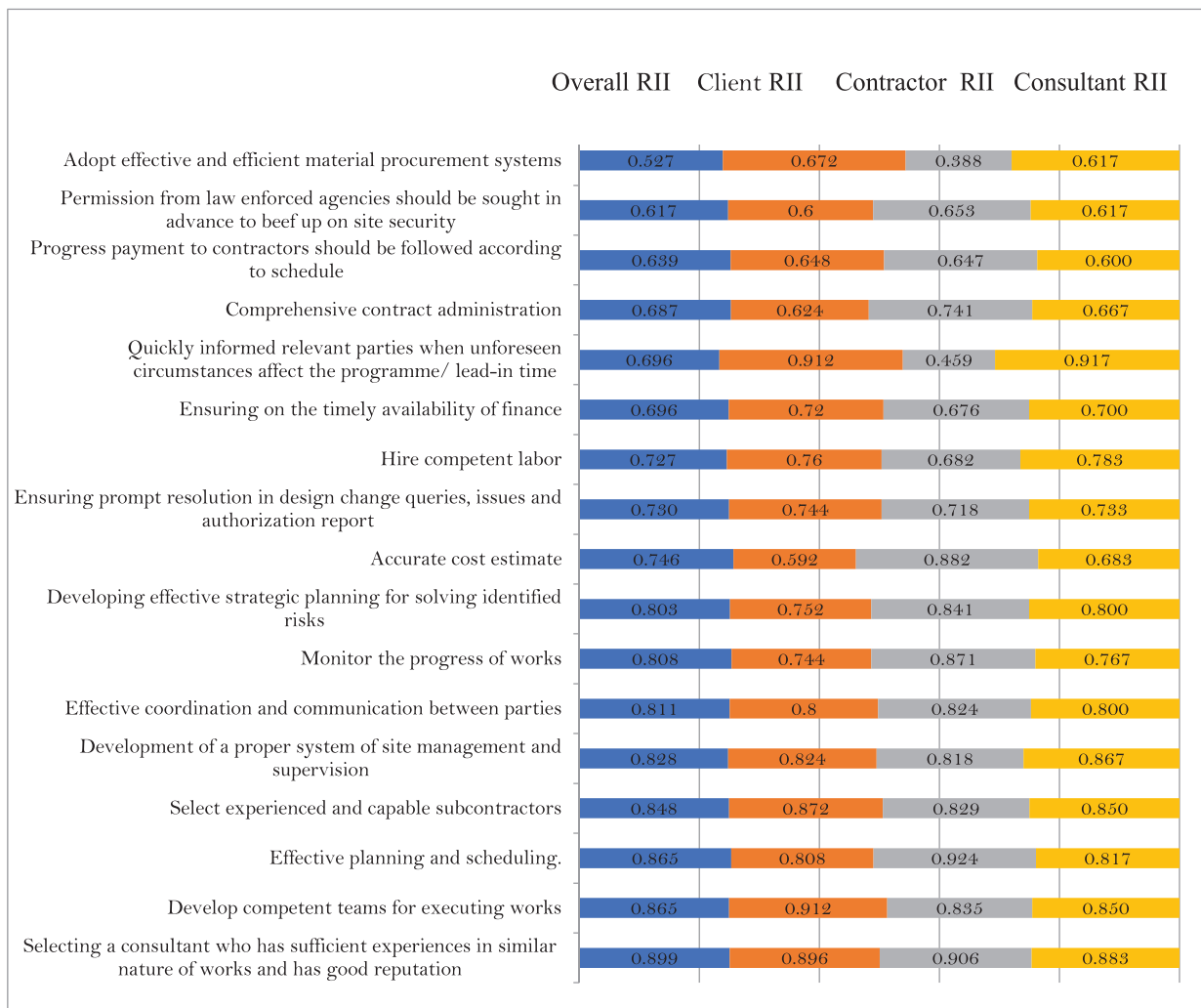
**Figure 8:** Top ten causes of time and cost overrun based on all respondents

#### 4.6 Mitigation Measure of Time and Cost Overrun

Time and cost overrun affects all the construction parties and external environment in different ways. Based on literature review and discussion, seventeen mitigating measures were identified and included in questionnaire form as follows. These were the mitigation measure for time and cost overrun and they were graded according to their respective RII values. Clients, contractors, and consultants who responded were asked to indicate the consequences by checking the relevant boxes in accordance with their own viewpoints. On the basis of the information gathered, the RII was determined.

Responses to the effects of construction work delays were given on a Likert scale with 1 representing strongly disagree and 5 representing strongly agree. RII values were used to order the impacts. According to the RII value of all replies, Figure 9 ranks the mitigation measure for the cost and time overrun. Client’s responses indicated “Develop competent teams for executing works” as the most significant mitigation measure for time and cost overrun. Similarly, Contractor’s representatives indicated “Effective planning and scheduling.” as the most significant mitigation measure for time and cost overrun.

Consultant representative indicated indicated “Quickly informed relevant parties when unforeseen circumstances affect the programme/ lead-in time” as the most significant mitigation measure for cost and time overrun “Selecting a consultant who has sufficient experiences in similar nature of works and has good reputation” as the overall most significant mitigation measure for time and cost overrun.



(Survey, 2023 A.D.)

**Figure 9:** Relative Importance Indices based on respondents of different category

### 4.8 Findings

After the collection of primary and secondary data, they were analyzed to find the reason of time overrun.

#### 4.8.1 Findings from Secondary Data

Eleven Construction Projects among the Fifteen Province level Construction project in Tanahun district faced time overrun. Roadway Upgrading Works along Kalimati Dudhekuna Manechauka suffered the most time overrun of 304.38% which is followed by Kalesti- Gajaude sector (0+500 to 4+000), Pansaye phant -Barkhatar sector (0+000 to 4+000) which faced the time overrun of 280.59%. In Province government some of the construction projects are multiyear. Due to this reason regarding cost overrun only the projects that faced variation order had the cost overrun and price escalation.

Among the Fifteen Province level Construction projects in Tanahun district four of them experienced the cost overrun and among them Risti khola bridge (Sotibes) faced the highest cost overrun of 11.58% due to additional work and change in the original design. Apart from this Cost overrun some of the Construction project experienced liquidated damages because completion date was later than the intended completion date. After studying and analyzing the province level construction projects the pattern of bidding by the contractor are analyzed. Figure 10 shows the bidding pattern of Construction projects by the contractor.

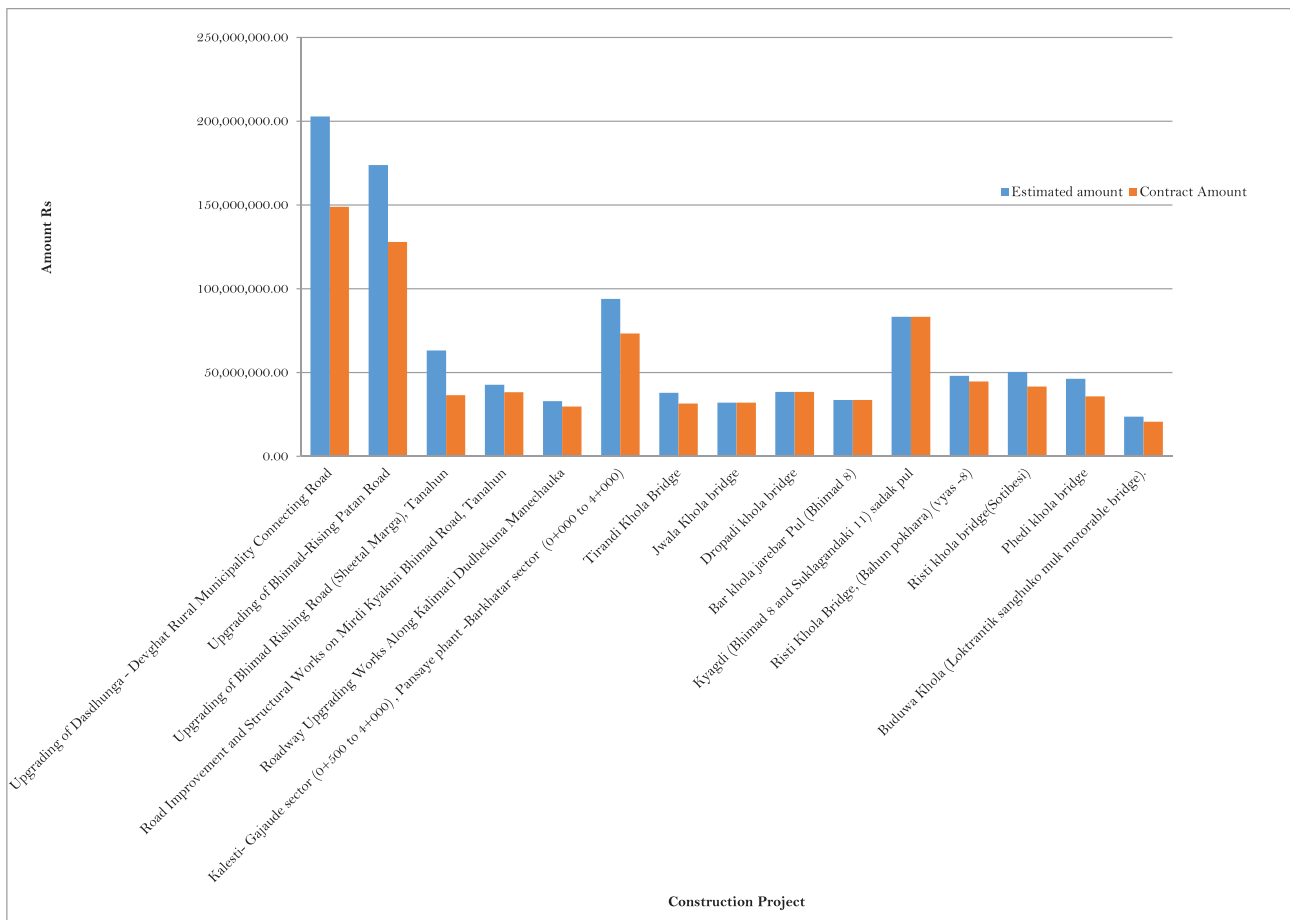


Figure 10: Bidding pattern of Construction Projects

#### 4.8.2 Findings from Primary Data

The validity of the five-point scale that was employed in the survey was examined using Cronbach's coefficient alpha. The measurement of internal consistencies approach revealed that the Cronbach's alpha values were higher than 0.7 for the following factors: client related ( $\alpha= 0.745$ ), contractor related ( $\alpha= 0.805$ ) Consultant related ( $\alpha= 0.701$ ) External factor ( $\alpha= 0.721$ ). As a result, it was determined that the respondents' responses were statistically reliable.

The following were the five most important causes of time and cost overrun, as determined by the responses of 71 respondents:

- i. Poor controlling of sub-contractor(s) by the contractor (Rank 1, RII=0.8704)
- ii. Improper technical studies by the contractor during the bidding stage (Rank 2, RII=0.8676)
- iii. Poor communications and misunderstanding (Rank 3, RII=0.8563)
- iv. Low bidding of contract (Rank 3, RII=0.8563)
- v. Unavailability of construction material testing labs (Rank 5, RII=0.8423)

Based on all replies, the following mitigation of cost and time overrun were ranked as being of the utmost importance:

- i. Selecting a consultant who has sufficient experiences in similar nature of works and has good reputation (Rank 1, RII=0.899)
- ii. Develop competent teams for executing works (Rank 2, RII=0.865)
- iii. Effective planning and scheduling. (Rank 2, RII=0.865)
- iv. Select experienced and capable subcontractors (Rank 4, RII=0.848)
- v. Development of a proper system of site management and supervision (Rank 5, RII=0.828)
- vi. Effective coordination and communication between parties (Rank 6, RII=0.811)

## 5. Conclusions

Among the Fifteen construction project 11 projects (80%) of them faced the time overrun and from these projects Roadway Upgrading Works along Kalimati Dudhekuna Manechauka experienced the most time overrun of 304.38% and Risti khola bridge (Sotibesi) experienced the least time overrun of 21.21%. Regarding the Fifteen construction projects four (26.67%) projects faced cost overrun. Risti khola bridge (Sotibesi) experienced the most cost overruns of 11.58% because of the omission of quantity in the original BOQ. Furthermore, Upgrading of Dasdhunga - Devghat Rural Municipality Connecting Road experienced the least cost overrun of 1.95% due to addition of the roadway width. Also, through the analysis of Province level construction projects Tanahun district various reasons for the time and cost overrun were found.

The length of the original contract was not determined by the client in a methodical manner with good scheduling of the work depending on the type of work, the availability of materials, the environment, and other external considerations. The initial contract period was not reasonable and adequate to finish the work. Roadway Upgrading Works along Kalimati Dudhekuna Manechauka had only contract period 365 days, which was not sufficient for the both structure and pavement works.

- i. COVID 19 affected the construction projects a lot. Most of the projects conducted in fiscal year 2076/77 faced time overrun. Upgrading of Bhimad-Rising Patan Road, Upgrading of Dasdhunga - Devghat Rural Municipality Connecting Road, are the major projects that were affected by COVID 19.
- ii. Unavailability of local construction materials due to restriction in exploitation of river affects the

- construction project in terms of time as well as cost. Tirandi Khola Bridge, Dropadi khola bridge project experienced the time and cost overrun due to this reason.
- iii. Unduly cheap bidding was found in our study, contractors were bidding without proper rate analyses of each item, without examining the site, without properly checking the availability of materials and local labor, and without analyzing other potential market risk factors. Bidding pattern of the Construction projects of Tanahun district shows on average Contractor bidding were done around 20% below the Tender amount. The habit of low bidding ultimately affected the construction project in terms of cost, quality and time. The bidding of Kalesti- Gajaude sector (0+500 to 4+000), Pansaye phant -Barkhatar sector (0+000 to 4+000) was 28.35% below the estimated amount. Due to low bidding contractor had to search for cheap alternatives to run the project as a result of which it experienced time overrun.
  - iv. Timely unavailability of budget for the payment to the contractor leads to both time and cost overrun in the construction work. Road Improvement and Structural Works on Mirdi Kyakmi Bhimad Road, Tanahun, Roadway Upgrading Works along Kalimati Dudhekuna Manechauka, Kalesti- Gajaude sector (0+500 to 4+000), Pansaye phant -Barkhatar sector (0+000 to 4+000) had faced the lack of budget by the GoN.
  - v. Omitting quantities in the original estimate for a construction project can indeed lead to cost overruns. Risti khola bridge (Sotibesi) experienced the 11.58% of cost overrun due to omission of right bank abutment in original estimate.
  - vi. The addition of new work or scope changes to a construction project can indeed lead to cost overruns. Upgrading of Dasdhunga - Devghat Rural Municipality Connecting Road had experienced the increase the width of roadway as compared to the original design.

By quantifying and evaluating replies from construction parties to questionnaire survey forms, the study's specific objectives to calculate Relative Importance Index (RII) of causes and mitigation measure of time and cost overrun were met. Client-related, contractor-related, consultant-related, and externally related issues were the four types of reasons of construction delays that were found. Seventy-One elements of time and cost overrun causes were further subcategorized into these groups. In all, the study took eighteen mitigation measures of time and cost overrun taken into account. Poor controlling of sub-contractor(s) by the contractor (Rank 1, RII=0.8704) was the most significant causes of time and cost overrun and selecting a consultant who has sufficient experiences in similar nature of works and has good reputation (Rank 1, RII=0.899) was the most significant mitigation measure for time and cost overrun.

## References

- Alenezi, Thamer. (2020). Covid-19 Causes of Delays on Construction Projects in Kuwait. *International Journal of Engineering Research and General Science*. 8. 35-39.
- Chitkara (2011) *Construction Project Management - Planning, Scheduling and Controlling* 2<sup>nd</sup> Edition, Tata McGraw Hills.
- GoN 2007 Public Procurement Act. Kathmandu: Public Procurement Monitoring Office Government of Nepal
- Kamandang, Z.R. and Casita, C.B. (2018). Delays in Construction Project: A Review. *IPTEK Journal of Proceedings Series*. 10.12962/j23546026.y2018i6.4631.
- Lee (2008). Delay and Cost Overruns in Vietnam Large Construction: A Comparison with Other Selected Countries. *KSCE Journal of Civil Engineering*, Volume 12. Issue6, pp.367
- M. Abubeker J (2015) Factors affecting time and cost overrun in road construction projects in Addis Ababadz, AAU, School of Civil and Environmental Engineering.
- Rajakumar A C, (2016) Analysis of Cost Overrun in Road Construction Activities – A Critical Review, Volume: 03 Issue: 04.
- Ramanathan, C., Narayanan S.P. & Idrus, A. B., 2012. Construction Delay Causing Risks on Time and Cost- a critical review. *Australasian Journal of Construction Economics and Building*, 1(12), pp.37-57.

- Richard Ohene Asiedu, Ebenezer Adaku, De-Graft Owusu-Manu, (2017) "Beyond the causes: Rethinking mitigating measures to avert cost and time overruns in construction projects", *Construction Innovation*, Vol. 17 Issue: 3, pp.363-380
- Roslan, Nadzirah & Zainun, Noor Yasmin & Memon, Aftab. (2014). Measures for Controlling Time and Cost Overrun Factors during Execution Stage. *International Journal of Construction Technology and Management*. 1. 8-11.
- Sambasivan M., & Soon Y. W., 2006. Causes and effects of delays in Malaysian construction industry. *International Journal of Project Management* 25 (2007) 517-526.
- Shrestha, P., & Tafazzoli, M. (2017). Investigating Causes of Delay in U.S. Construction Projects. 53rd ASC Annual International Conference Proceedings, pp.611-621
- Singh, R. (2010). "Delays and cost overruns in infrastructure project: Extent causes and remedies". *Economics and Political Weekly*, XLV (21), 43-54
- Subedi, D.P., Joshi, B.R. (2020). Identification of Causes of Delay in Road Projects: Cases in Gandaki Province, Nepal. *Saudi Journal of Engineering and Technology*, 231-243.
- Salunkhe, A. A., & Patil, R. S. (2014). Effect of construction delays on project time overrun: Indian scenario. *Int. J. Res. Eng. Technol*, 3, 543-547
- Marzouk, M.M. and T.I. El-Rasas (2014). "Analyzing delay causes in Egyptian construction projects." *Journal of Advanced Research* 5(1): 49-55.
- Isah, K.M.M.A.D. (2012). "Causes of Delay in Nigeria Construction Industry." *Interdisciplinary Journal of Contemporary Research in Buisness* 4(2): 785-794.
- Murray, M. and M. Seif (2013). "Causes of Project Delays in Nigerian Construction Industry." *European Journal of Civil Engineering and Architecture* 10(1): 1-7.
- Y. I. Park, and T. C. Papadopoulou. Causes of Cost Overruns in Transport Infrastructure Projects in Asia, *Built Environment Project and Asset Management*, Vol. 2, No. 2, 195-216, 2012.
- Acharya, Sudip & Bhandari, Babu & Timilsina, Narayan. (2021). Time Overrun Study in Construction Projects of Rural Municipalities in Syangja, Gandaki Province, Nepal.
- Y. Frimpong, J. Oluwoye, and L. Crawford. Causes of Delay and Cost Overruns in Construction of Groundwater Projects in a Developing Countries: Ghana as a Case Study, *International Journal of Project Management*, Vol. 21, 321-326, 2003.
- R. Apolot, H. Arinaitwe, and D. Tindiwensi. Investigation into the Causes of Delays and Cost Overruns in Uganda's Public Sector Construction Projects, *Journal of Construction in Developing Countries*, Vol. 18, 33-47, 2013.
- O. J. Ameh, A. A. Soyingbe, and K. T. Odusami. Significant Factors Causing Cost Overruns in Telecommunication Projects in Nigeria, *Journal of Construction in Developing Countries*, Vol. 15, No. 2, 49-67, 2010.
- L. Baloyi, and M. Bekker. Causes of Construction Cost and Time Overruns: The 2010 FIFA World Cup Stadia in South Africa, *Acta Structilia*, Vol. 18, No. 1, 51-67, 2011.
- Marzouk, M.M. and El-Rasas, T.I. (2014). Analyzing delay causes in Egyptian construction projects. *Journal of Advance Research*, 5(1):49-55. doi: 10.1016/j.jare.2012.11.005.
- Enshassi A., Lisk R., Sawalhi I. and Radwan I., 2003, Contributors to construction delays in Palestine, *The Journal of American institute of constructors*, Vol. 27, No. 2, 45-53.
- Odeh Abdalla and Battaineh Hussien T., 2002, Causes of construction delay: traditional contracts. *International Journal of Project Management*, Vol. 20, No.1, 67-73
- Smith, J. (2020). The Impact of Contractor Technical Staff on Project Delays. *Construction Management Journal*, 15(3), 123-137.
- Enshassi A., Lisk R., Sawalhi I. and Radwan I., 2003, Contributors to construction delays in Palestine, *The Journal of American institute of constructors*, Vol. 27, No. 2, 45-53.
- Olawale, Y. & Sun, M. (2010); Cost and Time Control of Construction Projects: Inhibiting Factors and Mitigating Measures in Practice, In the *Journal of Construction Management and Economics*, Vol. (28)(05), 509 - 526.
- Gunduz, M., Nielsen, Y. & Özdemir, M. (2013); Quantification of Delay Factors Using the Relative Importance Index Method for Construction Projects in Turkey, In the *Journal of Management in Engineering*, Vol. (29)(02), 133 - 139.
- Enshassi, A, Al-Najjar, J, & Kumaraswamy, M. (2009a); Delays and Cost Overruns in the Construction Projects in the Gaza Strip, In the *Journal of Financial Management of Property and Construction*, Vol. (14)(02), 126 - 151.
- Roslan, Nadzirah & Zainun, Noor Yasmin & Memon, Aftab. (2014). Measures for Controlling Time and Cost Overrun Factors during Execution Stage. *International Journal of Construction Technology and Management*. 1. 8-11.
- Danso, H. & Antwi, J. (2012); Evaluation of the Factors Influencing Time and Cost Overruns in Telecom Tower Construction in Ghana, In the *Journal of Civil and Environmental Research*, Vol. (02)(06), 15 - 24.