Evaluating the Impact of Disputes on Time and Cost of Projects

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ABSTRACT

Purpose: *Noise of impacts exists and it is essential to assure the significance factors. The study evaluates the impact of disputes on time and cost of road projects.*

Design/Methodology/Approach: *Based on Extension of earlier research 45 factors were identified using Literature Review and Case study followed by Questionnaire, Key Informant Interview. The Test Hypothesis for Significant impact was done using F-test.*

Findings/Result: *Complete time lost during the interaction would be about 37 years and a half year till date. Normal time lost 4 years and 8 months and 7 days for each undertaking. The debates, which have not been addressed, couldn't be surveyed. The aggregate sum spent on ADR just, for eight undertakings was 38 needs and 5 thousand, on the normal expense for a solitary venture was 4 lakhs and 76 thousand. In any case, the all-out cost caused couldn't be assessed until the debates have been totally settled. This cost included just Settlement/referees or the two charges different costs, for example, opportunity misfortunes and guaranteed cost are excluded. The serious issue that emerges because of debates is time invaded and cost overwhelm.*

Originality/Value: *The professionals assumed to get insights to create zero dispute projects based on real time cases.*

Paper Type: *Research paper*

Keywords: Road projects, Construction, Projects, Impact of disputes, Time and Cost of Projects

1. INTRODUCTION :

The road infrastructure development needs large amount of budget and resources [1 & 2]. There are several projects running under the department of roads and other departments in Nepal. The projects are made through International Contract Bidding (ICB) or National Contract Bidding (NCB) and questions the board in those ventures could result in to fruitful undertakings. If the disputes are not settled in time then it will increase complexity in project performance and results in failure of projects [3, 4, 5, & 6]. Transportation of Nepal needs serious attention as the existing transportation operation also needs budget for maintenance and new construction must be done to assure access equally on addressing the needs and budget is not sufficient without foreign aids [7 &8]. There are several causes of disputes arises in road construction projects. So, their identification and assessment of their impacts on project performance can helps to prevent disputes early and at the time of disputes. Subsequently, the specialist is intrigued to stay away from non-monetary cost of questions to forestall the undertaking to be expensive and assess the effectiveness of ADR for the settlement of the Disputes within very short interval [3, 4, 6,9,10, & 11]. This study is significant to warn stakeholders about the proper management of construction disputes regarding their impacts. It will act as the guiding document for disputes resolution in road construction project and helps to know the practices of settlement of disputes. This can help us to settle disputes more effectively and early.

2. STATEMENT OF THE PROBLEMS :

The primary seeds of debates were credited because of Defers in works progress, Plan blunder, Monetary disappointments of project workers, Nature of works, Specialized deficiency of workers for

hire, Installment delays, Semi-organized, Change in scope, Augmentation of Time (EoT) and Monetary hardships. Claims emerging from defer in work progress can be diminished by the sensible plan for getting work done with an asset organization plan. The business ought to intently screen the exercises with the endorsed work plan and give a suitable answer for the issues that emerges from questions/claims. Claims emerging from defer in installment can be diminished by methodical dispensing of installment or straightforwardly installment to individuals working gatherings under worker for hire. The income of the board of workers for hire can be controlled by the control component for the utilization of assembly stores on similar undertaking works. Experts should ensure BOQ and, still up in the air in the bid chronicles, are viable and as per existing site conditions. Presently a hearty investigation is expected to adjust the meaning of each variable [12, 13, & 14].

3. OBJECTIVES :

To analyze the impact of disputes on project performance in terms of time and cost.

4. LITERATURE REVIEW :

4.1 Claims in Construction Contract in Nepal

Let us through some lights on conflict, claim and dispute through Figure 1.

- Conflict – "serious disagreement and agreement about something important" (Collins, 1995) [5, 15, & 16]. Willmot and Hocker (1998) [5 & 17], on the other hand, provide a detailed definition of conflict as "an expressed struggle between at least two independent parties who perceive incompatible goals, scarce resources, and interference from other achieving those goals".
- Claim – "for the assertion of a right to money, property or remedy" (Powell- Smith and Stephenson, 1993) [5 & 17]. Likewise, Semple et al. (1994) [5 & 18] define a claim as "a request for compensation for damages incurred by any party to a contract".
- Dispute – "any contract question or controversy that must be settled beyond the jobsite management" (Diekmann and Girard, 1995) [5 & 18].

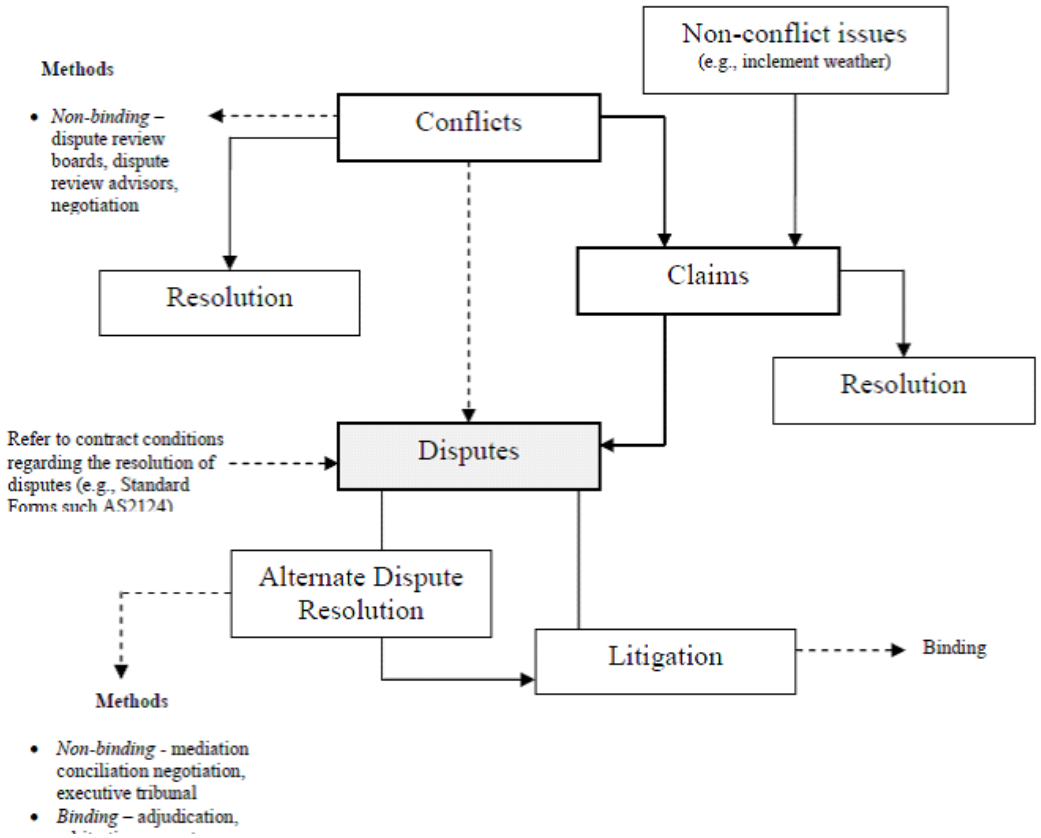

Fig. 1: Conflict, claims and disputes (Kumaraswamy, 1997) [5, 15, 16, 17, & 18].

4.2 Average Value of Disputes:

Overall finding of Global Construction Disputes 2021 shows a higher price of disputes. The global average value of the dispute is increased to $54.26 million (US).

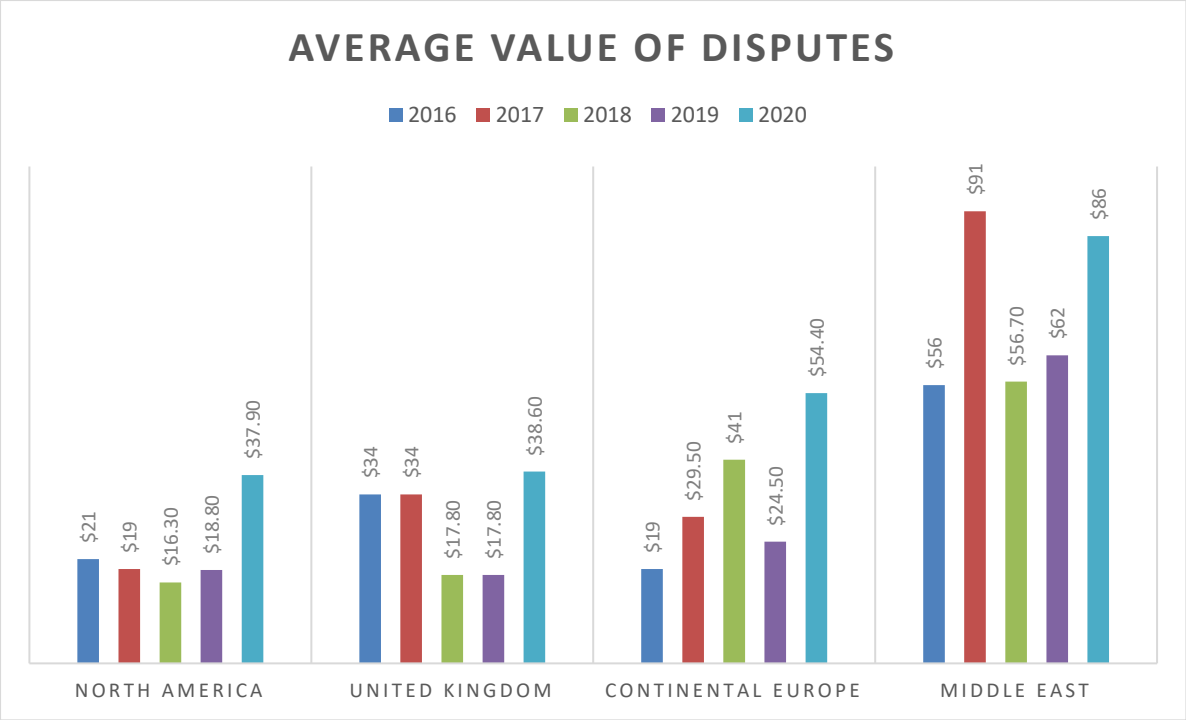

Fig. 2: Value of Disputes.

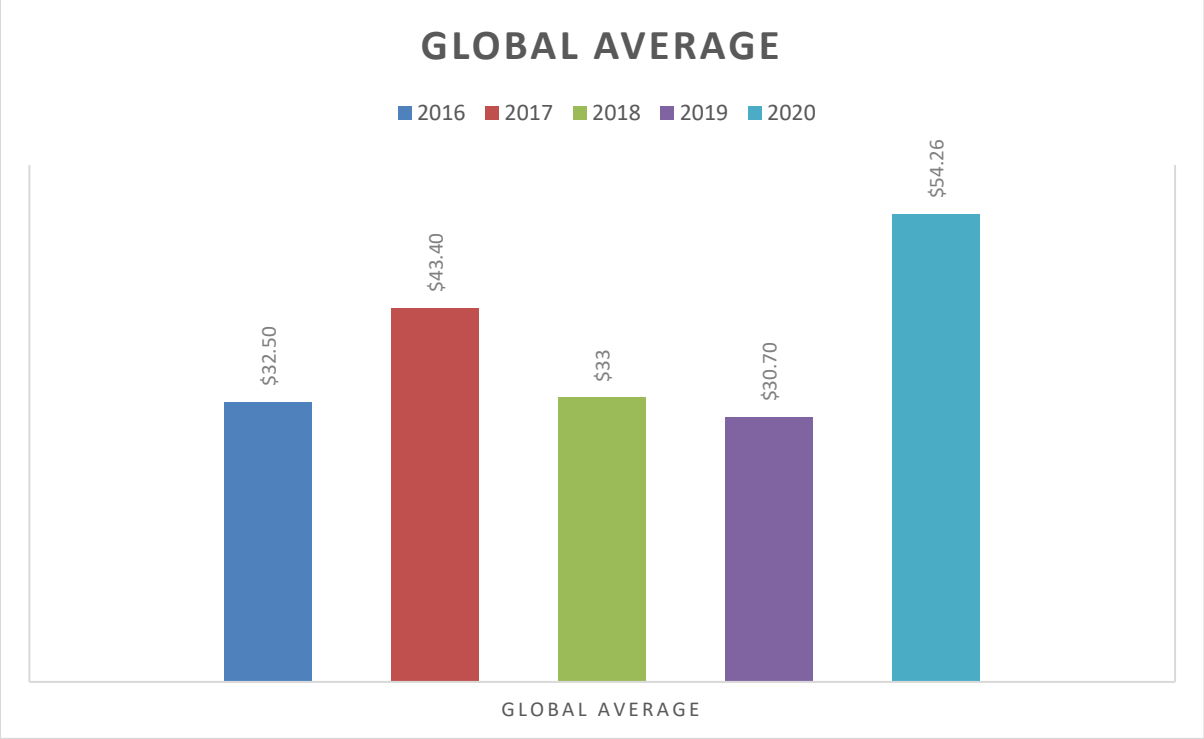

Fig. 3: The Global Average Value of Disputes
(Source: Global Construction Disputes Report 2021) [19]

4.3 Average disputes length:

The global average length of disputes dropped to 13.4 months.

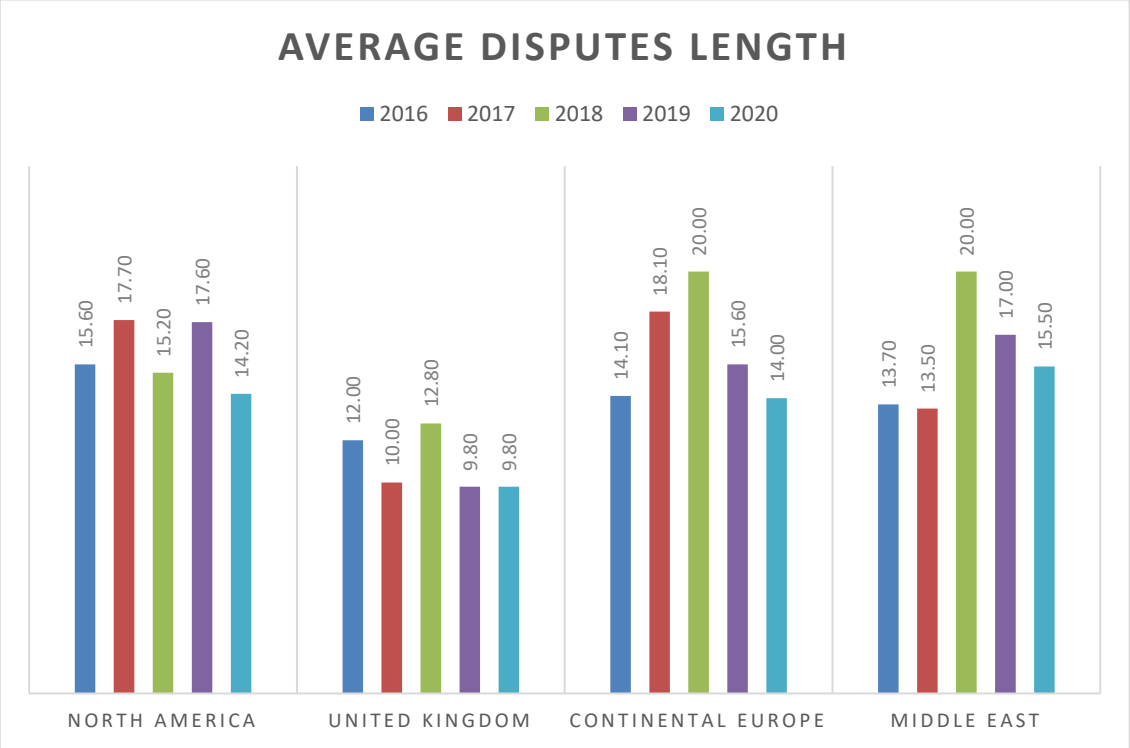

Fig. 4: Length of Disputes

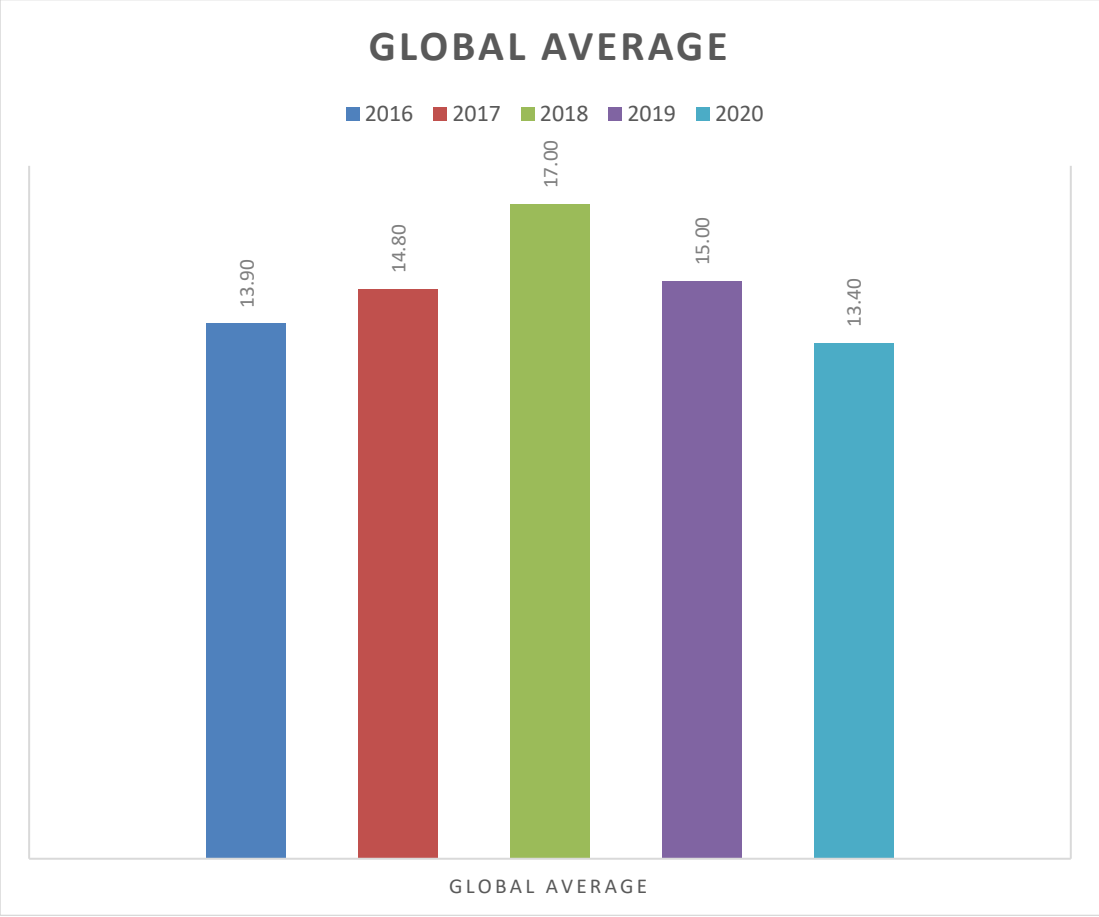

Fig. 5: The Global Length of Disputes

(Source : Global Construction Disputes Report 2021)[19]

The worth of questions is the mentioned sum for the extra works or occasion which is being asserted. The debates length is the period between when it becomes formalized under the agreement and the season of settlement or the finish of the hearing. The general volume of debates remained somewhat something very similar in 2020 as in 2019 while the typical worth of questions expanded essentially and the time taken to determine questions is diminished marginally, proceeding with the descending pattern from 2019 (2021 Global Construction Disputes Report) [19].

Table 1: Rank to causes of disputes in global.

2020 Rank	2019 Rank	Overall Disputes Causes
1	3	Proprietor/worker for hire/subcontractor neglecting to comprehend and additionally agree with its legally binding commitments
2	*	Proprietor coordinated changes
3	*	Outsider or power majeure occasions

Table 2: Rank to most popular methods for resolving disputes.

2020 Rank	2019 Rank	Most significant elements in the alleviation/early goal of questions
1	1	Proprietor/project worker readiness to think twice about
2	2	Precise and ideal timetables and surveys by project staff or outsiders
3	3	Worker for hire straightforwardness of cost information on the side of guaranteed harms

(Source: Global Construction Disputes Report 2021) [19]

5. METHODOLOGY :

5.1 Approach of the Research

The research is an extended analysis of earlier research conducted by Sauden et al, 2022 [12]. So, all the methodological aspects are the same with extended data analysis. The whole methodology can be summarized as given.

Table 3: Research Methodology Summary Table

Research Objectives	Types of Data	Source of Data	Research Tools
To analyze the impact of disputes on project time and cost.	Secondary data (Literature Review, Case study) Primary data (Questionnaire, Key Informant Interview)	Respondent (Project Clients, Consultants and Contractors) and Claim Documents	Using Excel, Test Hypothesis for Significant impact / F-test

Example of Data Analysis Sheet:

Ha1-1: There is Impact of disputes due to change in scope on project performance in terms of Time.

To test this hypothesis, Regression was used to find out if the impact of disputes due to change in scope on project performance in terms of Time.

Table 4: Regression to find the Impact of disputes due to *change in scope* on project performance in terms of Time

Regression Statistics	Values
Multiple R	0.292
R Square	0.085

Adjusted R Square	0.053							
Standard Error	1.146							
Observations	30							
ANOVA								
	df	SS	MS	F	Significance F			
Regression	1	3.430	3.430	2.612	0.117			
Residual	28	36.765	1.313					
Total	29	40.195						
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	3.993	0.787	5.073	0.000	2.381	5.605	2.381	5.605
Change in scope	0.334	0.207	1.616	0.117	-0.089	0.758	-0.089	0.758

The Examined (F) value was equal to (2.612) with possibility value (0.117) and it is higher than the specific value (0.05) which shows that there is no significant disputes due to change in scope on project performance in terms of Time.

So hypothesis was rejected:
There are no significant disputes due to change in scope on project performance in terms of Time. In the same pattern data for all 45 factors were assessed and impact has been confirmed.

6. RESULTS AND DISCUSSION :

There is a different nature of disputes/ claims, which have arisen during the construction phase of the individual road projects. Causes of disputes were found from case studies, semi structure interview and questionnaire surveys are discussed one by one in underlying sections.

6.1 Impact of Disputes in Particular Road Projects based on Case Studies

The study shows the settlement status of the projects and the type of cost arises during the settlement process and claimant cost. During this study only the cost of ADR is taken for the further data analysis. Out of Eight (8) projects, only four is settled and other four (4) is partially settled i.e. ADR awarded but it is still pending under course of prosecution. In the event that the date of settlement is expected the present date 14 May 2022, the all-out time lost during this settlement cycle is something like 37 years and a half year which is in normal close to 4 years and multi month and 7 days for each undertakings.
The aggregate sum spent of ADR is 38 lakhs 5 thousand. The typical expense of ADR is around 4 *lakhs* 76 thousand. This is just an expense of adjudicator and mediators on the stage under ADR. In any case, the misfortunes of useless representative, misfortunes of inspiration of worker, harms, business opportunity, should be resources, which can cause the tasks disappointment were not thought of. Unnecessary disputes and claims are hampering on the timely completion of project.

Table 5: Impact of Disputes in Particular Road Projects

S. No.	Project Name	Time Required for Settlement Process	Type of Cost encountered due to disputes.	
			Cost for ADR (NRs)	Cost rewarded as per claim. (NRs)

1.	KCHP/GC/19/068/69, Construction of Ghurmi-Chatara Koshi Corridor Sector, Km 146+100 to Km 149+600	On 2075/05/15 - Adjudicator, On 2077/06/01 - Arbitration and on 2078/11/03 - Upper court. (3.5 years till date)	639,875.00	0
2	KCHP/GC/12/068/69, Construction of Ghurmi-Chatara Koshi Corridor Sector, Km 16+920 to Km 18+880	On 2075/05/15 - Adjudicator, On 2077/06/01 - Arbitration and on 2078/11/03 - Upper court. (3.5 years till date)	584,875.00	0
3	KCHP/GC/01/068/69, Construction of Ghurmi-Chatara Koshi Corridor Sector, Km 0+000 to Km 2+160	On 2075/05/15 - Adjudicator, On 2076/10/02 - Arbitration and on 2078/01/12 - Upper court. (2.86 years till date)	387,000.00	293,974.00
4	TRIP/337312/RBID/2071/72/01, Upgrading and Construction of Rani-Biratnagar-Itahari-Dharan Road Sector.	On 2078/04/08 - Arbitration and till date pending- Upper court. (1.5 years till date)	451,994.50	16,920,154.00
5	AH/MT/1-03/068/69, Construction (Improvement) of Maitighar-Tinkune Road Section (1+300 to 2+660)	On 2073/03/12 - Adjudicator and on 2076/08/12 - Arbitration and 2077/12/24 - Upper court. (5.83 years)	356,362.00	9,506,935.44
6	EEAP/NCB/DG/03, Upgrading of Dhading-Gorkha Road, Ghyampesal-Gorkha Section (Km 54+300 to Km 64+500)	On 2078/03/03 - Arbitration and decision pending - Upper court. (0.833 years till date)	641,836.00	5,066,296.70
7	51-2067/68, Construction of Motorable Steel Truss Bridge over Marsyangdi River at Damaula, Purkot VDC, Tanahu.	On 2073/03/12- Adjudication, on 2076/08/12-Arbitration and till date pending on upper court. (6 years till date)	356,362.00	9,808,354.82
8	RIP/EXIM/TS-04, Upgrading of Tulsipur - Salyan Road (Km 0+000 to Km 61+744)	On 2065/07/12 - Adjudicator, On 2076/05/03 - Arbitration and on 2076/11/07- Upper court decision for reformation of arbitration. (13.5 years till date)	387,000.00	0

6.2 Impact assessment of Disputes in Road Contract from Questionnaire Survey:

Based on the interview, the table 6 below shows the existence of significant impact of top 10 major causes of disputes ranked by respondent on project performance criteria and the rest of impact assessment due to causes of disputes is shown.

Table 6: Impact of top 10 major causes of disputes overall ranked by respondent on Project Performance Criteria

Rank	Hypothesis	Project Performance in terms of Time.			Project Performance in terms of Cost.		
		F	Sig F	Impact	F	Sig F	Impact
1	Impact of disputes due to Delays in work progress on project performance.	39.068	1.90E-07	Impact Exists	47.845	2.16E-08	Impact Exists
2	Impact of disputes due to Exceptionally Low bid on project performance.	31.074	1.74E-06	Impact Exists	48.535	1.8E-08	Impact Exists
3	Impact of disputes due to Design error on project performance.	19.684	6.72E-05	Impact Exists	36.070	4.24E-07	Impact Exists
4	Impact of disputes due to Financial failure of contractors on project performance.	43.402	6.31E-08	Impact Exists	35.850	4.51E-07	Impact Exists
5	Impact of disputes due to Price fluctuation of construction materials on project performance.	25.691	8.99E-06	Impact Exists	23.988	1.56E-05	Impact Exists
6	Impact of disputes due to Quality of works on project performance.	7.817	0.007838	Impact Exists	21.454	3.6E-05	Impact Exists
7	Impact of disputes due to Quality of material on project performance.	4.4929	0.040135	Impact Exists	8.9357	0.0047	Impact Exists
	Impact of disputes due to Technical inadequacy of contractors on project performance.	23.602	1.76E-05	Impact Exists	31.017	1.77E-06	Impact Exists
	Impact of disputes due to Payments delay on project performance.	13.770	0.000614	Impact Exists	12.32	0.001	Impact Exists
8	Impact of disputes due to Political Influences on project performance.	28.832	3.39E-06	Impact Exists	32.019	1.32E-06	Impact Exists
9	Impact of disputes due to mistakes during construction stage on project performance.	31.729	1.438E-06	Impact Exists	38.040	2.5E-07	Impact Exists
	Impact of disputes due to change in scope on project performance.	2.252	0.1410	No Impact Exists	6.439	0.015	Impact Exists
10	Impact of disputes due to Slow in decision making on project performance.	13.508	0.000682	Impact Exists	7.757	0.008	Impact Exists
	Impact of disputes due to Extension of Time (EoT) on project performance.	31.767	1.42E-06	Impact Exists	47.427	2.38E-08	Impact Exists

	Impact of disputes due to financial difficulties on project performance.	75.590	7.54E-11	Impact Exists	60.980	1.2E-09	Impact Exists

6.1.3 Discussion on result of Hypothesis Testing:

The numerous impact factors were considered that were likely to occur in the road construction projects. Impact on project performance criteria were constructed based on impact was analyzed through regression model of hypothesis testing. Impact of major types/causes of disputes on project performance criteria (time and cost) were observed in following manner.

Disputes due to change **in scope** was found to have a no significant impact on project performance in planned project schedule. It is applied on the minor scales of works due to change in scope of works. Early identification of inaccurate activity time estimate, improper work breakdown and project schedule helps to increase/excess in due project schedule. The minor change is scope of works was adjusted with the parallel activities of works which result in no significant impact on project performance in planned schedule. The procurement act of Nepal should address it positively in existing provisions [20 & 21].

- At the same time disputes due to change in scope of works was found to have a significant impact on project performance in cost. Most of the practices on road construction sites in context of Nepal, the clients instruct the works which is not in scope of works during arrangement. So, due to addition of works it has significant impact on cost.
- Disputes due to **Technical inadequacy of contractors** were found to have a significant impact on project performance in planned project schedule and estimated project cost. The clients should wisely select the most efficient contractor that complies with both standard and special circumstances. The incompetent contractor fails on management of resources and activities of works. So the criteria of selection contractor should be investigated to satisfy the construction of road projects.
- A dispute due to payment delay was found to have a significant impact on project performance in planned project schedule and estimated project cost. For the smooth run of project as per the schedule there need to be proper cash flow management. Payment delay break out the flow of cash for the construction activities. So, if there is timely payment it helps to meet the schedule project performance.
- A dispute due to quality of works was found to have a significant impact on project performance in planned project schedule and estimated project cost. Quality of works gives the conformance of works so that it can be acceptable. If the construction works don't meet the required quality then it is rejected or non-conformance and it must be re-constructed to achieve the quality of works. This repetition of works required time and cost for the same work. So, the quality of works helps to meet the schedule project performance.
- Disputes due to **Delay in work progress** was found to have a significant impact on project performance in planned project schedule and estimated project cost. Extensive delays in work results in exceeds in initial time and increase in direct and indirect cost of project.
- Disputes due to **Design error** was found to have a significant impact on project performance in planned project schedule and estimated project cost. The construction phase of the project depends on the approved design. There have been extreme issues of failures and other serious matters as a result of design errors.
- Disputes due to **financial failure of contractors** was found to have a significant impact on project performance in planned project schedule and estimated project cost. If the accounting personnel of contractor are typically not equipped to handle and the controls are not adequate, the contractor may experience problems with delayed billing, poor project estimation and cash flow problems.
- Disputes due to **Extension of time** were found to have a significant impact on project performance in planned project schedule and estimated project cost. Extension of time has an impact on the price fluctuation of the construction materials, manpower and equipment.
- Disputes due to **financial difficulties** were found to have a significant impact on project performance in planned project schedule and estimated project cost. The delays in work are due to delay in payment and financial failures of contractors. Many projects suffer from the deficiency of timely budget whereas proper cash flow management is required for the smooth run of projects.

The similar observations were made in previous research also that means professionals should take it as constraints for smooth operation of projects performance without disputes [22, 23, 24, 25 & 26].

7. CONCLUSION :

From the primary data, obtained from the questionnaire study, out of forty five (45) number of causes of the disputes, the change in scope have not significant impact on the project execution with regards to time and cost.

Also, from the examination of optional information got from contextual investigation, the serious issue emerges because of questions is time invaded and cost overwhelm. Debates drives the task to be expensive regarding time, cost, in any event, declining quality and business opportunity misfortune, at long last the disappointment of undertakings. In the event that the date of settlement is expected the present date 14 May 2022, the complete time lost during this cycle would be something like 37 years and a half year which is moderately 4 years and 8 months and 7 days for each tasks. The aggregate sum spent of ADR is 38 lakhs 5 thousand. The typical expense of ADR is around 4 lakhs 76 thousand. Claims emerging from defer in work progress can be diminished by practical plan for getting work done with asset sending plan. The business ought to intently screen the exercises with endorsed work plan and give suitable answer for the issues emerges from debates/claims.

Claims emerging from postpone in installment can be decreased by precise dispensing of installment or straightforwardly installment to individuals working gatherings under project worker. The income the board of project workers can be control by control system for the utilization of activation reserve on a similar undertaking works. Advisors ought to guarantee BOQ and contract periods, determined in the bid records, are practical and according to existing site conditions.

8. RECOMMENDATIONS :

Following are the recommendations.

- Consultants should timely submit the corrected drawing with any information on location to work with smooth execution of work and settle on brief choices in regards to the specialized and legally binding issues by taking business endorsement where fundamental in determined time as required.
- Specialists ought to sort out a post agreement grant meeting mutually with workers for hire (counting specialized group) to affirm material accessibility, constructability and different limitations hailed up by project workers before their site preparation.
- Claims arise due to design errors and the quality of work can be reduced by strict enforcement of standard specification and Quality Assurance Plan (QAP).
- The project monitoring / evaluation and control system should be enforced strongly.
- A dispute settlement unit after the amicably (i.e., negotiation) stage should be one of conciliation/mediation/adjudication for to facilitation on the basis of the evidence before the arbitration as arbitration is time and resource consuming.

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