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Analysis of Payment Delay in Road Construction Projects: The Case Road Division Surkhet, Nepal

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Abstract

Payment has been an issue of major concern in the construction industry and most contractors reported that they have gone through late payment situations in government-funded projects. The issue of delayed payment in the construction industry is a global phenomenon. The objective of this research is to analyze the payment delays in the Department of Road, Road Division Surkhet construction projects. Altogether there are 61 projects under construction. Each representative from the contractor and all engineers from the Employer are selected as respondents. The Cronbach's alpha test was run, and the overall alpha value was found to be 0.978. The employer's topmost rank is 'unavailability of the budget under cause attributable to the employer, contractors' failure to understand the contract agreement under causes attributable to the contractor, and differing site conditions under causes beyond the party's control. In contrast, the contractor ranks the topmost cause as unavailability of the budget, contractors' failure to follow certain procedures in a claim, and price escalation of the major construction materials respectively. The view of the employer emphasized that the delay in payment brings significant effects on the delay in project progress and creates cash flow problems for contractors with the value. Whereas contractors emphasized that the delay in payment creates cash flow problems for contractors. The employer has suggested that the contractor submit the latest progress work invoicing with adequate documents while asking for the payment to reduce the delay time in payment. In contrast, the contractor has suggested that both parties should understand the terms or clauses of payment in the project. The combined view of employer and contractor emphasized that Both parties should understand and should compel the terms or clauses of payment in the project to reduce the delay in the payment. The Hypothesis test also showed that there is a significant difference between the view of employer and contractor on the causes, effects, and possible solutions to reduce delay in the payment.

Keywords: Payment delay, Attributable, RII Rank

1. Background of the Study

Any nation's development depends heavily on the construction industry, which both initiates and depends on economic growth. The sector establishes the structures and infrastructure projects necessary for social and economic development, which subsequently adds to global economic expansion. Success in economic development will also boost disposal incomes, creating a need for more construction-related activities. The sector employs a variety of people, including experts like architects, engineers, and surveyors, as well as primary

contractors, suppliers, and finally, manual laborers who are employed by these contractors. Owners, developers, the government, bankers, insurers, planners, consultants, prime contractors, subcontractors, suppliers, manufacturers of equipment, plant and machinery, etc. are among the major players in the construction industry and take part in the payment process. Payment has been an issue of major concern in the construction industry and the majority of contractors reported that they have gone through late payment situations in government-funded projects whilst more of them affirmed the same situation in privately funded projects. The issue of delayed payment in the construction industry is a global phenomenon (Hasmori, Ismail, & Said, 2012).

Construction projects are frequently deemed successful when they are finished on schedule, within price, following specifications, and to the satisfaction of all stakeholders. Since construction projects typically take a long time to complete, require significant financial investments, and frequently use credit payment terms rather than payment upon delivery when buying materials, the significance of payment is further emphasized (Ali, 2006). Several indicator variables can be used to detect construction delays. Owner performance in paying contractors is one important element and it involves the Client, Contractor, and Consultant. The contractor's mistakes in submitting claims are the major causes of delayed payment. This includes claims filed without using the proper procedures, claims with insufficient supporting documentation, and claims calculated incorrectly. Contractors occasionally need to present their claims, and after making the required corrections, the entire process must be repeated (Ansah, 2011). According to (Olusegun & Michael, 2011), delayed payments cause the command structure and communications to break down, which in turn causes the loss of continuity of construction activities. Most advisors and contractors claimed that the owner's payment delay issues caused the projects to suffer. Payment delays from the owner to the contractor in a construction project cause performance delays and issues with time management. This could also result in conflicts between the contractor and the employer. All of that will have an impact on how well the completed endeavor performs overall. It shall be established that the contractor may inform the owner and request that the owner make a progress payment if the owner or developer fails to do so within the period specified in the contract. The owner may bargain with the contractor for payment on deferred conditions if the owner continues to withhold payment after receiving the contractor's notice. If the contractor and the owner concur, the owner will pay interest on past-due accounts. The contractor may suspend work, and the owner will be responsible for any contract violations if both parties are unable to reach an accord and the contractor is unable to complete his work (Ansah, 2011). Due to these issues, some developed nations, including the United Kingdom, Singapore, New Zealand, and some Australian states, have passed their own construction-specific legal payment security regimes that purposefully enact provisions to address issues with immediate payment in the construction industry, eliminate as much bad payment behavior as possible, and smooth the contractor's cash flow (Hasmori, Ismail, & Said, 2012). In Nepal, the bid document and contract agreement detail every payment circumstance. Payment delays to construction contractors in the government and non-government sectors of the Nepali construction industry are a serious problem. It frequently has significant root causes, including project completion delays and financial losses for the contractor, and subcontractors. Payment delays negatively affect freelancers, particularly those with limited capital. Additionally, it has a negative domino impact on other participants in the construction industry, including suppliers, subcontractors, and end users. The most significant contribution to economic growth is made by roads and highways, which also have significant social benefits. In addition, giving access to social health, education, and employment opportunities makes a highway network essential in the fight against poverty. Numerous scholars investigated the implications of postponing road and highway projects with the significance of such projects (Ayudhya, Exploring Causes of Delay in Payment from Parties involved in Road and Highway Projects in Thailand, 2022). Large sums of money are required for Road and Bridge construction projects, and most contractors find it extremely challenging to cover the high daily construction costs when payments are delayed. Due to delayed payments and insufficient cash flow to cover construction costs, particularly for less fiscally stable contractors, work progress may be delayed (Sambasivan & Soon, 2006). Contractors' financial flow is impacted by delays in interim payments and/or the release of retention amounts by project owners, which has an impact on other project participants further down the supply chain. Construction companies working at the lower end of the supply chain frequently go out of business because of these practices. There are many ways to address the industry's payment issues, some of which have been included in construction contracts or legislation in other developed nations, such as the payment of specified interests, the elimination of the "pay when paid" clause, liens, and payment bonds. Even though many standard forms of construction contracts include sufficient payment methods for work completed, the construction industry continues to struggle with the persistent issue of delayed payments. Due to the need to fully understand this issue to resolve payment delays and ensure uninterrupted construction, the Contracts of the Department of Road, Road Division of Surkhet are chosen as the research topic. Numerous ongoing construction projects in Road Division Surkhet have not yet been finished because of various kinds of project delays. Payment delays to the contractor due to a variety of factors are among the most significant delays in DoR initiatives. To ascertain the reasons behind payment delays on the building projects of the DoR, Road Division Surkhet, the research concentrates on identifying their causes, effects, and potential mitigating actions.

1.1 Statement of Problem

It is evident from the literature and historical accounts of the Nepali construction industry that late payments to contractors could have a significant negative effect on construction projects. Therefore, it was essential to conduct a research study to pinpoint payment delays, along with their causes and scenarios, and to determine the key variables that influence them. Due to the payment delay, it causes financial hardship, a negative domino effect on other parties, cash flow issues, a delay in project completion, negative societal impacts, and other issues like liquidation and project abandonment. It has been claimed that the primary feeder of Nepal's construction sector is payment. Payment delays are one of the major issues with DoR construction initiatives. Many participants in the construction industry, whether in publicly or privately financed projects, are impacted by late payments for work completed. It severely impairs cash flow, particularly for contractors, and has disastrous cascading effects further along the contractual payment chain. This issue might result in formal dispute resolution such as "arbitration" or "litigation," which are very expensive and time-consuming procedures. It causes a delay in the project's completion and challenges for the contractor, who must spend a lot of money every day to pay for the construction process. This compels many researchers to investigate this phenomenon in addition to the factors that contribute to construction payment delays and potential remedies. Many construction projects experience payment delays, and the severity of the delays varies greatly from project to project. Therefore, it was crucial to research how payment delays affect projects and how to reduce their causes in our own institution's projects.

1.2 Research Objectives

The general objective of this research is to analyze the payment delays in the Department of Road, Surkhet construction projects. The specific objectives of this research are as follows:

- To identify the factors that cause payment delays in construction projects.
- To identify the effects of the payment delay on construction projects.
- To suggest possible mitigation measures for the causes of payment delays on construction projects.

2. Literature Review

There are three major parties engaged in paying contractors during the payment process i.e. owner, contractor, and consultant. The procedure of paying contractors is typically broken down into three steps for each interim payment. The contractor's submission of an invoice to the proprietor or the owner's representative was the first step. The second step involved inspection and the issuance of the inspection certificate. Both quantity surveyors/engineers and consultants are considered as having approved and issued certificates on the agreed-upon amount of work completed. Payment is the third step, and the owner completes direct payment. The simultaneous occurrence of at least two separate delays is a factor in payment delays. Those delays are both within and outside of the contractor's authority. The most frequent, expensive, complicated, and risky issue in construction projects is generally recognized to be a delay, which could put significant pressure on construction time and cost (Ayudhya, Exploring Causes of Delay in Payment from Parties involved in Road and Highway Projects in Thailand, 2022). The lack of payment has a cascading effect on everyone else involved in the endeavor, whether directly or indirectly. It influences the project's time, expense, and quality outcomes. The financial performance and total profitability of the contractor, the subcontractors, and the material suppliers eventually declined (Jiang, 2012). Payment delays are caused by various causes. In the majority of initiatives, there has been negligence on the parts of the owner, contractor, and consultant. Owners who fail to make payments on time typically do so because they do not comprehend the terms of the contract, act with integrity by not paying the contractor on time, and fail to adhere to established procedures while failing to concur on the valuation of work, errors in contractor claims, and failure to submit claims are causes of contractor-borne failure to execute payment to contractors on time (Kaaz, Ulubeyli, & Tuncbilekli, 2012 Volume 18(3)).

2.1 Causes of Delayed Payment

Delayed payments will never bring justice to any party in the construction industry (Arditi & Chotibhongs, 2005). There may be a variety of causes for delayed reimbursements (Nazir & Mohd, 2006). When payment is delayed by one stakeholder, it might affect the whole payment chain of the construction project (Odenigbo, Odusami, Okolie, & Okafor, 2021) Delays in payment impact the construction industry due to a variety of factors (Nazir & Mohd, 2006). (Sambasivan & Soon, 2007) list 28 important factors that caused the payment to be delayed and group them into eight categories: client-

related, contractor-related, consultant-related, material-related, labor and equipment-related, financial-related, contract-related, and related to external factors. Determining the contributing elements that result in delayed payments is therefore necessary**.**

2.2 Impacts of Delayed Payment

It is important to understand the structure of the construction industry and how payment is distributed within a construction project to examine the effects of payment default in the construction industry. The financial institution is the first party in the payment cascade, followed by the main contractor, the subcontractor, and so forth. One party in the payment chain going bankrupt could have a significant negative effect on parties further down the contractual chain. The challenges are made even more difficult by the fact that it is customary to include a "pay-when-paid" stipulation in the subcontractor's contract. The subcontractor will also bear the responsibility for the primary contractor's self-inflicted payment delays, which will have an impact on the subcontractor's cash flow (Ansah, 2011). In the construction industry, disputes frequently stem from unpaid contractors. All issues in the construction business start, when payment is not made in full by the due date indicated on the statement according to (Arditi & Chotibhongs, 2005). As relationships break down, disagreements turn into arguments, setting the scene for conflict with its attendant finger-pointing, blaming, judging, buck-passing, and attorneys. Initial time estimates for projects are exceeded, expenses rise, and there are significant delays. Delayed payments never bring justice to contractors and subcontractors (Arditi & Chotibhongs, 2005). Its effects are sometimes so harsh that some companies must close down. One of the biggest consequences would be the interest due on capital borrowed. Contractors often borrow working capital from banks to finance their construction operations and invariably have to pay interest on these borrowings. Contractors are heavily reliant on employers making regular interim payments throughout the building process to help them pay off the debt they have accumulated. Therefore, the interest a contractor must pay to the bank

in the form of finance charges will always rise if interim payments are not made on time, by the conditions agreed upon, or for the correct amount. Delayed payment will also affect the contractor’s performance. They may lose their workers. The contractor might not have sufficient funds to tide them over until the conflict is resolved and the next payment is received in terms of the contract. The construction process will be delayed, and the list goes on. But one thing is for sure: delayed payments or non-payment to contractors have a negative influence on the overall construction process. It should be understood that ‘the practice of efficient and timely payment in construction projects is a major factor that can contribute to a project’s success. Payment delays also influence subcontractors. Because most contract forms contain "pay-when-paid" and "pay-if-paid" clauses, primary contractors frequently pay subcontractors after the due date. The effects of the vendors receiving late payments are severe. When faced with such circumstances, some subcontractors tend to raise their bids, which raises the overall project cost and is unpleasant for the owners. If developers pay main contractors on time and main contractors pay their subcontractors as soon as possible after the conclusion of the subcontract work, it should be possible to improve subcontractor payment practices (Ansah, 2011). A delayed payment by one party may affect the entire supply chain of payment for a construction project. It is universally accepted that delayed payment affects the contractor’s cash flow, which in turn can affect the progress of the works and profitability (Ali, 2006). The risk of delayed payment from the Employer will impact the duration and cost of the project. As a result of delayed payments, financial stress can occur due to inaccurate cash forecasts and/or deficiencies in cash flow management (Kaka & Price, 1991).

2.3 Remedies for Delayed Payments

All common contract types stipulate a time frame, known as the "period of honoring certificate," during which the employer must pay the contractor the full amount of the job that was completed. The type of standard form of contract chosen determines the length of time certificates are honored. A contract violation will occur if the employer doesn't pay the contractor within this time frame. Generally, the fact that a breach of contract has been committed does not automatically bring the contract to an end. Parties to a contract are bound by the terms to which they have agreed, and e.g., the case of delayed payment by the employer does not give the contractor the right to treat the contract as being at an end; it is regarded as a minor or normal breach. Thus, the contract still subsists, and the contractor is obliged to proceed

with the carrying out of the works regularly & diligently and of course in a good and work-like manner. According to (Samaraweera, Perera, & Dewagoda, 2019) some strategies like the following should be adopted for payment delay remedies: The Construction Industry Security of Payment Act should be drafted and passed quickly, Introduction of a payment bond/promissory note, which requires a third party, such as a bank or an insurance company, to guarantee the payment in the event of default by the paying party, Establishment of an overall quality assurance system to be used as a checklist to prevent the employer from issuing flawed or poorly prepared tender documents, Introduction of milestones or stage payments whereby a pre-agreed sum is paid when the work has reached a certain milestone, Making it a mandatory requirement to set aside a sum of money in an independent escrow account, Making it a right of the contractor to refer to employer's financial status during the bidding stage and to be aware of the actual funding provided the project. There are many ways to address the issue of delayed payments in the industry. Some of these options have been included in construction contracts or statutes in other developed countries, such as the payment of stipulated interest, suspension of work, right to slow down work, removal of the "pay-when-paid" clause, right to refer disputes to adjudication, creation of a right to a lien, and establishment of a trust account.

3. Methodology

3.1 Research Design

To analyze the payment delay in construction projects implemented by DoR, Road Division Surkhet Office, various literature and articles on related topics (published as well as unpublished) were reviewed. The primary and secondary data were collected through the methods of observation and questionnaire. The questionnaire survey obtained from the concerned stakeholders was then analyzed and interpreted to achieve the research objective.

3.2 Research approach

The approaches that were used in this study are qualitative research approaches as the collected data were presented and analyzed with proportion. To, measure the degree of agreement and disagreement between contractor and employer, a quantitative approach was used. The study consists of a qualitative research approach for analysis. The information was collected as a literature review, questionnaire survey, KII, Data entry, analysis, and interpretation, Research report with findings and conclusion.

3.3 Limitation

This study is applicable for under-construction projects in Road Division Surkhet only and the study does not cover all types of construction industry. The questionnaire is dependent on the voluntary participation of the respondents under the sample size.

3.4 Study Area

The study area covers the projects being implemented by the DoR, Road Division Surkhet. The projects are basically from Surkhet and Dailekh districts.

Figure3.1: Study Area
Source: (ARMP, Department of Roads, 2023)

3.5 Study Population, Sample Selection and Sample Size

The study population for the research comprised of number of construction contracts that are being implemented by Road Division Surkhet in different locations. Altogether there are 61 projects under construction. Each representative from the contractor and all engineers from Employer are selected as a respondent.

Table3.1: Total Population used for the Analysis

Respondent Types	Number of Population	Sample Size
Employer's Engineer	7	7
Contractor's Representative	61	61
Total	68	68

3.6 Data Collection

The study was based on primary as well as secondary data. For Primary Data Collection Key Informant Interviews (KII) were done before floating the questionnaire to the respondents with the Division Chief of the DOR, Surkhet, representative from contractor's association and relevant experts. The structured interviewing method was used. The KII was conducted to validate the questionnaires of the study. A set of different questionnaires were prepared for the engineers of the DoR, Surkhet and Contractors. The questionnaires were related to assessing the causes and effects of the delay in payment and possible solutions to reduce delay in payment in DoR-executed projects. Journal articles, textbooks, websites, social media, news, etc. were used for the collection of secondary data. Reports and publications regarding the study were studied to gather ideas about the research problem, issues, and other ideas related to the research works. Some specific secondary data required for the study was collected from Contract Agreements, Claim Documents, Correspondence, Conditions of Contracts, Relevant textbooks, Prevalent acts and regulations, Published and unpublished literature, journals, and reports, Records of the related government offices, Online search mediums such as science direct, research gate, sci-hub, Google scholar, etc., and previously conducted research available in different institutions.

3.7 Data Analysis

After the process of collection of data from primary and secondary sources, they were analyzed by the descriptive method. For the easier interpretation of data, they are expressed in percentages. Those

percentages are implemented to express the findings as a proportion of the whole. For easy understanding, these findings are expressed in the form of charts and tables. The information was gathered using both online and hard-copy surveys. The data collected from the questionnaire was analyzed using the Microsoft Excel application for ranking the factors overall and by the group of project parties (employer and contractor) using the RII. Before analysis began, several preliminary processes were adapted: editing data, addressing blank responses, coding data, categorizing data, producing data files, and doing certain statistical calculations. These procedures were designed to assure data consistency and allow for meaningful interpretation of results. To analyze the collected data and information from the questionnaire or interview Relative Importance Index method was used. This analysis was used for ranking the criteria concerning their relative importance. The relative importance index (RII) has been calculated as follows:

$$RII = \sum \frac{W}{A \, x \, N}$$

Here, w = weight as assigned by each respondent on the scale of 1 to 5 where 1 implies the least and 5 implies the highest. A= highest weight and N is the total number of samples.
Also, for further statistical analysis, degree of agreement and disagreement between the engineers of Employer and Contractor was determined by using Kendall's coefficient of concordance. The degree of agreement can be determined by using the following equation. (Shaban, 2008)

4. Results and Discussions

4.1 Causes of Delay in Payment

Table 4.1: Individual RII values and their corresponding rank given by the employer and contractor.

Factors	Employer		Contractor	
	RII	Rank	RII	Rank
Attributable to the Employer				
Unavailability of the budget	0.80	1	0.92	1
Verification of the IPCs from engineer	0.49	9	0.58	9
Unrealistic cash flow pattern of the employer	0.66	3	0.60	7
Employer's poor financial management	0.74	2	0.81	2
Employer's failure to agree to the valuation of work	0.57	6	0.60	7
Employer's failure to implement good attitude by wrongfully withholding payment	0.63	5	0.67	6
Poor estimation of project cost	0.57	6	0.70	4
Delay in certification of work done by engineer	0.51	8	0.71	3
Change orders	0.66	3	0.68	5
Attributable to the Contractor				
Contractor failure to agree to the valuation of work	0.80	4	0.61	5
Contractors' failure to understand the contract agreement	0.86	1	0.63	4
Contractors' failure to follow the certain procedures in a claim	0.80	4	0.70	1
Contractor failure to do work based on BOQ	0.77	6	0.55	6
Contractor failure to execute as per the milestones of the schedule	0.83	2	0.63	3
Contractor failure to maintain quality of works	0.83	2	0.65	2
Beyond Party's Control				
Inflation in the project cost	0.74	4	0.69	5
Changes in Exchange rate	0.60	5	0.63	6
Unavailability of major construction materials	0.80	2	0.73	3
Price escalation of the major construction materials	0.60	5	0.76	1
Differing site condition	0.83	1	0.70	4
Force majeure event	0.80	2	0.74	2

4.1.1 Causes behind the delay in payment - Attributable to the Employer

Attributable to the employer there were nine different factors behind the causes of the delay in the payment. Among nine different factors, the view of employers for the topmost cause behind the delay in payment is 'unavailability of the budget' with an RII value of 0.80 and the least cause behind the delay in payment is 'verification of the IPCs from the engineer' with RII value of 0.49. Whereas, for the contractor, the same factor causing a delay in the payment stands topmost and the same factor stands the least cause with the RII value of 0.92 and 0.58 respectively.

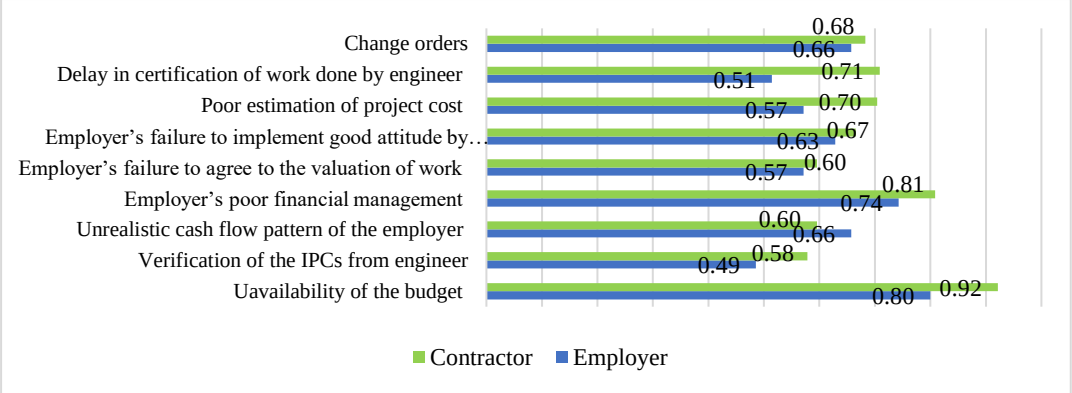

Fig4.1: Causes of delay in payment- Attributable to the Employer

Hypothesis testing for above causes.

Null Hypothesis: H0: There is no significant difference between the view of employer and contractor on the causes behind the delay in the payment – attributable to employer.

Alternative Hypothesis: H1: There is a significant difference between the view of the employer and contractor on the causes behind the delay in the payment – attributable to the employer.

Table4.2: Hypothesis testing:

Field	w	Chi-Square	p-value	Decision
Causes behind the delay in the payment – Attributable to Employer.	1.618	25.883	3.627E-07	Reject: H0

Since the p-values (Sig.) is less than a = 0.05, (a is the level of significance) the null hypothesis, H0, is rejected and the alternative hypothesis, H1, is accepted. Thus, it can be said that there is a significant difference between the view of the employer and contractor on the causes behind the delay in the payment – attributable to the employer.

4.1.2 Causes behind the delay in payment - Attributable to the Contractor

Attributable to the contractor there were six different factors behind the causes of the delay in the payment. Among six different factors, the topmost cause behind the delay in payment is 'Contractors' failure to understand the contract agreement' with an RII value of 0.86 and the least cause behind the delay in payment is 'Contractor failure to do work based on BOQ' with RII value of 0.77. In contrast, the contractors' view is different from the employer's. The contractor thinks that the most cause behind the delay in payment- attributable to the contractor is the Contractors' failure to follow certain procedures in a claim' with the RII value of 0.70 and surprisingly, the least cause behind the delay in payment is the same as of the employer's view i.e., 'Contractor failure to do work based on BOQ' with RII value of 0.55.

Hypothesis testing for the above causes.

Null Hypothesis: H0: There is no significant difference between the view of the employer and contractor on the causes behind the delay in the payment – attributable to the Contractor.

Alternative Hypothesis: H1: There is a significant difference between the view of the employer and contractor on the causes behind the delay in the payment – attributable to the Contractor.

Table4.3: Hypothesis testing:

Field	w	Chi-Square	p-value	Decision
Causes behind the delay in the payment – Attributable to Contractor.	0.705	7.408	7.937E-03	Reject: H0

Since the p-values (Sig.) is less than a = 0.05, (a is the level of significance) the null hypothesis, H0, is rejected and the alternative hypothesis, H1, is accepted. Thus, it can be said that there is a significant

difference between the view of the employer and contractor on the causes behind the delay in the payment – attributable to the contractor.

4.1.3 Causes behind the delay in payment - Beyond the party's control.

Under these causes, six different factors behind the causes of the delay in the payment were assessed. Among six factors, for the employer, the topmost cause behind the delay in payment is 'differing site conditions' with an RII value of 0.83 and the least cause behind this is 'Price escalation of the major construction materials' with an RII value of 0.60. Similarly, for the contractor, the most common cause behind the delay in payment beyond the party's control is 'Price escalation of the major construction materials' with an RII value of 0.76, and the least cause is 'Changes in Exchange rate' with an RII value of 0.63.

Hypothesis testing for the above causes.

Null Hypothesis: H0: There is no significant difference between the view of the employer and contractor on the causes behind the delay in the payment – Factors beyond party's control.

Alternative Hypothesis: H1: There is a significant difference between the view of the employer and contractor on the causes behind the delay in the payment – Factors beyond the party's control.

Table4.4: Hypothesis testing:

Field	W	Chi-Square	p-value	Decision
Causes behind the delay in the payment – Factors beyond the party's control.	0.5333	5.333	2.092E-02	Reject: H0

Since, the p-values (Sig.) is less than a = 0.05, (a is the level of significance) the null hypothesis, H0, is rejected and the alternative hypothesis, H1, is accepted. Thus, it can be said that there is a significant difference between the view of the employer and contractor on the causes behind the delay in the payment – beyond the party's control.

4.1.4 Ranking of collective causes behind the delay in payment

Collectively all 21 causes behind the delay in payment under three different headings were assessed to find out the view of both employer and contractor and has been tabulated in table 6.5

Table 4.5: Collective RII values and their corresponding rank – Employer and Contractor's View

Factors	Employer		Contractor	
	RII	Rank	RII	Rank
Unavailability of the budget	0.80	5	0.92	1
Verification of the IPCs from the engineer	0.49	21	0.58	20
Unrealistic cash flow pattern of the employer	0.66	13	0.60	18
Employer's poor financial management	0.74	11	0.81	2
Employer's failure to agree to the valuation of work	0.57	18	0.60	18
Employer's failure to implement good attitude by wrongfully withholding payment	0.63	15	0.67	12
Poor estimation of project cost	0.57	18	0.70	7
Delay in certification of work done by an engineer	0.51	20	0.71	6
Change orders	0.66	13	0.68	11
Contractor failure to agree to the valuation of work	0.80	5	0.61	17
Contractors' failure to understand the contract agreement	0.86	1	0.63	16
Contractors' failure to follow certain procedures in a claim	0.80	5	0.70	7
Contractor failure to do work based on BOQ	0.77	10	0.55	21
Contractor failure to execute as per the milestones of the schedule	0.83	2	0.63	14
Contractor failure to maintain quality of works	0.83	2	0.65	13
Inflation in the project cost	0.74	11	0.69	10
Changes in Exchange rate	0.60	16	0.63	14
Unavailability of major construction materials	0.80	5	0.73	5

Price escalation of the major construction materials	0.60	16	0.76	3
Differing site condition	0.83	2	0.70	7
Force majeure event	0.80	5	0.74	4

According to the relative importance index (RII), it was found that the employer puts a high emphasis on the contractor's failure to understand the contract agreement with the value of 0.860 and thinks the most significant causes behind the delay in the payment among all causes. Whereas the contractor thinks that the unavailability of the budget with the RII value of 0.92 is the most significant cause behind the delay in the payment. In addition, it has been observed that the rank of the collective causes for the employer is quite different than the individual rank given by them. However, the contractor's view towards the collective rank and the individual rank stands to a substantial degree.

Table 4.6: Collective RII values and their corresponding rank – Combined View

Factors	Combined View	
	RII	Rank
Unavailability of the budget	0.906	1
Verification of the IPCs from the engineer	0.566	21
Unrealistic cash flow pattern of the employer	0.604	18
Employer's poor financial management	0.800	2
Employer's failure to agree to the valuation of work	0.592	19
Employer's failure to implement good attitude by wrongfully withholding payment	0.660	13
Poor estimation of project cost	0.687	9
Delay in certification of work done by an engineer	0.683	10
Change orders	0.679	11
Contractor failure to agree to the valuation of work	0.634	16
Contractors' failure to understand the contract agreement	0.657	15
Contractors' failure to follow certain procedures in a claim	0.717	7
Contractor failure to do work based on BOQ	0.581	20
Contractor failure to execute as per the milestones of the schedule	0.660	13
Contractor failure to maintain quality of works	0.672	12
Inflation in the project cost	0.698	8
Changes in Exchange rate	0.630	17
Unavailability of major construction materials	0.736	4
Price escalation of the major construction materials	0.736	4
Differing site condition	0.721	6
Force majeure event	0.747	3

Table 6.6 above shows the collective causes behind the delay in payment in the combined view of both the employer and the contractor. The combined view shows that the most significant causes behind the payment among all 21 causes are: Unavailability of budget, Employer's poor financial management, Force majeure event, Unavailability of major construction materials, and Price escalation of the major construction materials Similarly, the least significant causes are: Verification of the IPCs from engineer, Contractor failure to do work based on BOQ, Employer's failure to agree to the valuation of work, Unrealistic cash flow pattern of the employer, Changes in Exchange rate. According to the relative importance index (RII), it was found that the combined view of the employer and contractor emphasized on Unavailability of budget

with the value of 0.906 as the most significant cause behind the delay in the payment among all causes. Whereas they think that verification of IPCs from the engineer with the RII value of 0.566 is the least significant cause behind the delay in the payment

4.2 Effects of Delay in Payment

Fourteen different effects led by the delay in the payment have been assessed. The RII value and its corresponding rank given by the Employer and the Contractor, and the combined rank has been presented in the different sections.

Table 4.7: Effect of Payment Delay – Employers View

Factors	RII	Rank
Delay in payment to the contractor has effect on delay in project progress	0.886	1
Delay in payment to the contractor has an effect Extension of time	0.771	8
Delay in payment to the contractor Creates cash flow problems for contractors	0.886	1
Delay in payment to the contractor disrupts work schedule	0.857	3
Delay in payment to the contractor impacts the time schedule of the project	0.829	4
Delay in payment to the contractor results in a contractual dispute	0.800	7
Delays in payment to the contractor decrease productivity	0.829	4
Delay in payment to the contractor Abandonment of the project	0.657	13
Delay in payment to the contractor will increase construction costs	0.686	10
Delay in payment to the contractor creates a negative relationship	0.829	4
Delays in payment to the contractor impact the quality of the project	0.743	9
Delay in payment to the contractor forces towards uncertain condition	0.686	10
Delay in payment to the contractor creates defects in the project	0.686	10
Delay in payment to the contractor impact Environmental protection Health and safety	0.657	13

Table 6.7 above shows the employer's rank towards the possible effects that may arise due to a delay in the payment. The employer has ranked the most significant effect due to the delay in the payment among 14 different consequences: Delay in payment to the contractor influences delay in project progress, Creates cash flow problems for contractors, creates a disruption of the work schedule, creates a negative relationship, and decreases productivity. Similarly, the least significant effects due to delay in payment are the impact on Environmental protection Health and safety, and abandonment of the project. According to the relative importance index (RII), it was found that the view of the employer emphasized that the delay in payment brings significant effects on the delay in project progress and creates cash flow problems for contractors with the value of 0.886 and ranked as first. Whereas they think that delay in payment has a very lesser significant effect on Environmental protection Health and safety and the chances of abandonment of the project by the contractor with the RII value of 0.657.

Table 4.8: Effect of Payment Delay – Contractors View

Factors	RII	Rank
Delay in payment to the contractor has effect on delay in project progress	0.939	3
Delay in payment to the contractor has an effect Extension of time	0.817	6
Delay in payment to the contractor Creates cash flow problems for contractors	0.961	1
Delay in payment to the contractor disrupts work schedule	0.922	4
Delay in payment to the contractor impacts the time schedule of the project	0.839	5
Delay in payment to the contractor results in a contractual dispute	0.943	2
Delays in payment to the contractor decrease productivity	0.800	7
Delay in payment to the contractor Abandonment of the project	0.617	11
Delay in payment to the contractor will increase construction costs	0.600	12
Delay in payment to the contractor creates a negative relationship	0.791	8
Delays in payment to the contractor impact the quality of the project	0.591	13
Delay in payment to the contractor forces towards uncertain condition	0.778	9
Delay in payment to the contractor creates defects in the project	0.670	10
Delay in payment to the contractor impact Environmental protection Health and safety	0.587	14

Table 6.8 above shows the contractor's rank towards the possible effects that may arise due to a delay in the payment. The employer has ranked the most significant effect due to the delay in the payment among 14 different consequences: Creates cash flow problems for contractors, results in a contractual dispute, influences delay in project progress, and disrupts the work schedule, impacting the time schedule of the project. Similarly, the least significant effects due to delay in payment are the impact on Environmental protection Health, and safety, and impacts on the quality of the project. According to the relative importance index (RII), it was found that the view of the contractor emphasized that the delay in payment

creates cash flow problems for contractors with a value of 0.961 and ranked as first. Whereas they think that delay in payment has a very lesser significant effect on Environmental protection Health and safety and quality of the project.

Table 4.9: Effect of Payment Delay – Combined View

Factors	RII	Rank
Delay in payment to the contractor has effect on delay in project progress	0.932	2
Delay in payment to the contractor has an effect Extension of time	0.811	6
Delay in payment to the contractor Creates cash flow problems for contractors	0.951	1
Delay in payment to the contractor disrupts work schedule	0.913	4
Delay in payment to the contractor impacts the time schedule of the project	0.838	5
Delay in payment to the contractor results in a contractual dispute	0.925	3
Delays in payment to the contractor decrease productivity	0.804	7
Delay in payment to the contractor Abandonment of the project	0.623	11
Delay in payment to the contractor will increase construction costs	0.611	12
Delay in payment to the contractor creates a negative relationship	0.796	8
Delays in payment to the contractor impact the quality of the project	0.611	12
Delay in payment to the contractor forces towards uncertain condition	0.766	9
Delay in payment to the contractor creates defects in the project	0.672	10
Delay in payment to the contractor impact Environmental protection Health and safety	0.596	14

Table 6.9 above shows the combined view of the employer and contractor toward the possible effects that may arise due to a delay in the payment. The three topmost ranked significant effects due to the delay in the payment among 14 different consequences are: Creates cash flow problems for contractors, influences delay in project progress, and results in a contractual dispute. Similarly, the least significant effects due to delay in payment are the impact on Environmental protection Health, and safety. According to the relative importance index (RII), the combined view of employer and contractor emphasized that the delay in payment creates cash flow problems for contractors with a value of 0.951 and ranked as first. Whereas they think that delay in payment has very lesser significant effect on Environmental protection Health and safety and the quality of the project.

Hypothesis testing for the above causes.

Null Hypothesis: H0: There is no significant difference between the view of employer and contractor on the effect due to delay in the payment.

Alternative Hypothesis: H1: There is a significant difference between the view of employer and contractor on the effect due to delay in the payment.

Table4.10: Hypothesis testing:

Field	W	Chi-Square	p-value	Decision
Effects due to delay in payment	0.993	25.829	3.731E-07	Reject: H0

Since the p-values (Sig.) is less than a = 0.05, (a is the level of significance) the null hypothesis, H0, is rejected and the alternative hypothesis, H1, is accepted. Thus, it can be said that there is a significant difference between the view of employer and contractor on the effects due to delay in the payment.

4.3 Possible Solutions to Reduce Delay in Payment

Fourteen different possible solutions to avoid the delay in the payment have been assessed through a questionnaire survey. The RII value and its corresponding rank given by the Employer and the Contractor, and the combined rank has been presented in the different sections.

Table 4.11: Possible Solutions to reduce delay in payment – Employer's View

Factors	RII	Rank
The contractor to submit the Latest progress work invoicing submitted must have adequate documents	0.914	1
Both parties Understand the terms or clauses of payment in the project	0.886	2

In order to address the problem in a timely manner, mutual discussion of problems with client	0.886	2
The payment matter should be followed up constantly with the client	0.857	4
Payment provision in the standard form of contract is applied properly	0.800	8
Statutory enactment must be implemented to deal with payment in the construction industry	0.629	14
People's mentality and attitudes must be changed in order to achieve timely payments	0.857	4
Client Financial management must be implemented to mitigate cash flow problems	0.800	8
Client Setting an established time frame for payment	0.829	7
The effect of payment issues on the project's progress must be understood by all parties and personnel involved	0.857	4
Right for contractors to suspend work in the event of late or non-payments to be established	0.657	13
The provision of 'pay when paid clause' to be introduced in the construction contract	0.743	11
Right of contractors to charge interest on late payment to be established	0.686	12
The limit of the amount that the client can hold the money to be established	0.800	8

According to the relative importance index (RII), it was found that the employer has suggested that the contractor submit the latest progress work invoicing submitted must be with adequate documents while asking for the payment. They think that this will significantly reduce the delay time in payment. They have ranked this suggestion in the first rank with an RII value of 0.914. However they don't think that delay in payment can be reduced by implementing statutory enactment to deal with payment in the construction industry as they rank this as fourteenth with RII value of 0.629.

Table 4.12: Possible Solutions to reduce delay in payment – Contractor's View

Factors	RII	Rank
The contractor to submit the Latest progress work invoicing submitted must have adequate documents	0.857	7
Both parties Understand the terms or clauses of payment in the project	0.926	1
In order to address the problem in a timely manner, mutual discussion of problems with client	0.904	4
The payment matter should be followed up constantly with the client	0.826	10
Payment provision in the standard form of contract is applied properly	0.926	1
Statutory enactment must be implemented to deal with payment in the construction industry	0.904	4
People's mentality and attitudes must be changed in order to achieve timely payments	0.800	12
Client Financial management must be implemented to mitigate cash flow problems	0.852	8
Client Setting an established time frame for payment	0.883	6
The effect of payment issues on the project's progress must be understood by all parties and personnel involved	0.913	3
Right for contractors to suspend work in the event of late or non-payments to be established	0.839	9
The provision of 'pay when paid clause' to be introduced in the construction contract	0.752	13
Right of contractors to charge interest on late payment to be established	0.822	11
The limit of the amount that the client can hold the money to be established	0.796	14

According to the relative importance index (RII), the contractor has suggested that the best possible solution to reduce the delay in the payment is that both parties should understand the terms or clauses of payment in the project with an RII value of 0.926. However, they think that delay in payment cannot be reduced significantly by introducing the provision of a 'pay when paid clause' in the construction contract with an RII value of 0.752.

Table 4.13: Possible Solutions to reduce delay in payment – Combined View

Factors	RII	Rank
The contractor to submit the Latest progress work invoicing submitted must have adequate documents	0.864	7
Both parties Understand the terms or clauses of payment in the project	0.921	1
In order to address the problem in a timely manner, mutual discussion of problems with client	0.902	4
The payment matter should be followed up constantly with the client	0.830	9

Payment provision in the standard form of contract is applied properly	0.909	2
Statutory enactment must be implemented to deal with payment in the construction industry	0.868	6
People's mentality and attitudes must be changed in order to achieve timely payments	0.808	11
Client Financial management must be implemented to mitigate cash flow problems	0.845	8
Client Setting an established time frame for payment	0.875	5
The effect of payment issues on the project's progress must be understood by all parties and personnel involved	0.906	3
Right for contractors to suspend work in the event of late or non-payments to be established	0.815	10
The provision of 'pay when paid clause' to be introduced in the construction contract	0.751	14
Right of contractors to charge interest on late payment to be established	0.804	12
The limit of the amount that the client can hold the money to be established	0.796	13

According to the relative importance index (RII), the combined view of employer and contractor emphasized that the best possible solution is that Both parties should understand and should compel the terms or clauses of payment in the project to reduce the delay in the payment with an RII value of 0.926. However, they both think that delay in payment cannot be reduced significantly by introducing the provision of a 'pay when paid clause' in the construction contract with an RII value of 0.752.

Hypothesis testing for the above causes.

Null Hypothesis: H0: There is no significant difference between the view of employer and contractor on the possible solutions to reduce delay in the payment.

Alternative Hypothesis: H1: There is a significant difference between the view of employer and contractor on the possible solution to reduce delay in the payment.

Table4.14: Hypothesis testing:

Field	W	Chi-Square	p-value	Decision
Possible solution to reduce delay in the payment	1.450	37.692	8.285E-10	Reject: H0

Since, the p-values (Sig.) is less than a = 0.05, (a is the level of significance) the null hypothesis, H0, is rejected and the alternative hypothesis, H1, is accepted. Thus, it can be said that there is a significant difference between the view of employer and contractor on the possible solutions to reduce delay in the payment.

5. Conclusion and Recommendations

5.1 Conclusion

The conclusion and respective recommendations of this study are based on a critical review of the literature, a questionnaire survey, and the analysis of the data collected through the checklist. Following conclusions are made from this study: Under causes behind the delay in payment- attributable to the employer, the employer's topmost rank is 'unavailability of the budget'. Under the causes behind the delay in payment- attributable to contractors, the employer's topmost rank is contractors' failure to understand the contract agreement. In contrast, the contractor ranks the topmost cause as contractors' failure to follow certain procedures in a claim. Under the causes behind the delay in payment- beyond the party's control, the employer ranked the topmost cause as 'differing site conditions. For the contractor, the topmost cause is the price escalation of the major construction materials. The combined view of the employer and contractor emphasized the Unavailability of the budget as the most significant cause behind the delay in the payment among all causes. The view of the employer emphasized that the delay in payment brings significant effects on the delay in project progress and creates cash flow problems for contractors with the value. Whereas contractors emphasized that the delay in payment creates cash flow problems for contractors. The employer has suggested that the contractor submit the latest progress work invoicing must be with adequate documents while asking for the payment to reduce the delay time in payment. In contrast, the contractor has suggested that both parties should understand the terms or clauses of payment in the project. The combined view of employer and contractor emphasized that Both parties should understand and should compel the terms or clauses of payment in

the project to reduce the delay in the payment. The Hypothesis test also showed that there is a significant difference between the view of employer and contractor on the causes, effects, and possible solutions to reduce delay in the payment.

5.2 Recommendations

The study raised several implications on the issues related to the delay in payment. It draws recommendations on the causes of the payment delay followed by the effects and impacts of delay in payment and lastly also recommends the possible solutions that can be implemented to avoid or to reduce the delay-related issues in the payment. The study recommends that the factors that have high RII value should be internalized by both parties individually as the most significant causes associated with the delay in payment. In addition, the study also recommends that the factors with the highest RII are the most significant factors combinedly rated by both parties and should be adjusted with the ratings of the employer and the contractor. The common factor that both the parties need to be discussed further to analyze more in detail. It also recommends that both parties need to work out the causes attributable to them to reduce their internal inconsistencies and work for the external factors which are beyond the party's control. The study recommends that the effects of the delay in payment to the contractor need to be analyzed in detail and the employer should work on reducing and mitigating the impact by reducing

the causes of the delay particularly those that are attributable to the employer. On the other side, the effects of delay in payment and its consequences to the employer need to be understood by the contractor, and should cooperate to reduce its impacts which are attributable to them. The study also recommends possible solutions for minimizing or reducing causes of delay in payment, one party should acknowledge the other party's recommendation and should work together on it.

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