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RESEARCH ARTICLE

IMPACT OF PERFORMANCE ON PROFITABILITY OF SMALL HYDROPOWER PROJECTS IN NEPAL

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ABSTRACT

Construction is a complex industry and its performance determines profitability. Performance of any construction project refers to attainments of its construction within specified time and cost with maintaining safety and quality. The objective of this research is to assess the impact of performance on profitability of small hydropower projects in Nepal. Two projects namely, Upper Hugdi Khola Hydropower Project and Bijaypur Khola Hydropower Project were considered for detail cost performance, schedule performance and profitability analysis. Time management, cost and safety in construction enhance the performance of the construction and increase the profitability of the project. It is clear that the performance management enhances the profitability of project; however other factor such as social issues as well as internal management plays the vital role in overall profitability of the company. Even though, Upper Hugdi Hydropower Project had completed on time and less than estimated cost but the financial indicators of the projects has been decreasing because of other external factors. The IRR of the project had decreased from 15.18 percent to 13.42 percent. The construction organization should incorporate the identified factors in practice for enhancing the performance to increase the profitability.

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INTRODUCTION

Most of the hydropower projects in Nepal have not been completed on time and within the estimated cost. Time and cost overrun in hydropower projects are very common problems. Till date, in case of hydropower projects in Nepal, there is no any specific research in the field of performance enhancement in local level. The economic development and growth of any country also depends on the performance of construction mega projects or any other multi-dimensional developmental sector. Profitability of project depends on the performance of the construction. If the performance of the construction is high then the profitability of the project also increases and vice versa. A strong relationship between management and employee can help to enhance the performance. Among all these bad scenario of hydropower development of Nepal, few of the small hydropower projects developed by the private sectors are constructed within time frame as well as within the estimated cost. One of the examples among those projects is Hugdi Khola Hydropower Project, 5 MW project developed by RuRu Hydropower Company, in Gulmi district of Nepal. The project was completed before 6 months of project schedule and also with the significant reduction in cost. Both selected are runoff river (RoR). A good performance of any construction project refers that it is free from defects, right things at right time and the continuous improvement of the project. It is measured with the time, cost, quality and safety of the project. The productivity as well as the satisfaction yield in quality aspect project is also the major part of the performance of construction. The profitability of any organization depends with the performance of construction.

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Rationale of Study

Keeping the project functions constant, time and cost are the performance measures of hydropower construction. For ensuring the profitability, it is most to ensure performance. The research to endorse the performance evaluation of the hydropower construction and its effect on the project to set the benchmark for the performance related issues. Due to availability of very few researches in the area, the research is highly demanded.

Research Objectives

The objective of the study is to assess the impact of performance on profitability of the hydropower projects in Nepal developed by Independent Power Producers (IPP'S).

Significance of Study

This research study also helps to:

I) Assist the government, owners, designers and contractors regarding performance for hydropower construction.
II) Provide information for local experts, decision makers and those foreign experts approaching in the region to work for Hydropower development.

So, it incorporates the necessity of this study on the performance evaluation of hydropower projects and its application on the real project.

Literarure review

Performance Measurement

In manufacturing and construction industries, performance measurement is used as a systematic way of judging project performance by evaluating the inputs, outputs and the final project outcomes (Zhang and Fan, 2009). Performance measurement received substantial attention from researchers and the construction industry over the past two decades, thus awareness of the importance use of appropriate performance measures and its role in supporting the application of lean construction concepts (Sarahan, 2002). However, very few companies systematically measure their performance in a holistic way. Moreover, the existing systems tend to focus more on product and less on process and design. The construction Industry performance is affected by national economies (Navon, 2005). This can lead to the sub-optimal quality of the performance measurement system, the misjudging of relative performance, and to complacency and the denying of appropriate rewards to the deserving. When measurements are being implemented, contractors, consultants and the management team's performances are blamed as the major reasons for the failure of a particular project. The other project stakeholders, such as client, suppliers, trade contractors and the community at large, are neglected (Takim and Akintoye, 2002).

Role of Performance Measurement in the Development of Hydropower Construction

Ofori (2001) posits that the absence of measurable targets in the development programs to guide and assess, at intervals, the success of their implementation is a possible reason for lack of progress and the persistence of problems in the construction industry. The continuous monitoring of the performance helps the construction industry to improve and sustain the industry. So, the sustainability in the area is very important for the long run. More importantly, the goal could be better achieved if the approach takes into consideration the very peculiar nature of the industry as outlined by Hillebrandt (1984): (i) the nature of the final product, (ii) the structure of the industry and the organization of the construction process, (iii) the determinant of demand, (iv) method of price determination. The performance in the hydropower construction depends on various factors. The success factor for the good performance depends on the Project Manager's Competence, Top Management Support, Monitoring and Feedback by Project Participants, Interaction among project participants and Owners' Competence. Furthermore, the failure factors for the performance are Conflict among the Project participants, Hostile socio economic and climate condition, PM's Ignorance and Lack of Knowledge, Faulty Project Conceptualization, Project specific factors and Aggressive competition during tendering (Jha and layer, 2006).

Use of Performance Assessment in Ensuring Favourable Outcomes

The PMI (2004) recommends five distinct but interrelated project management process groups: initiation, planning, execution, monitoring and closing process groups. Monitoring and controlling is central to project management processes. Monitoring and controlling is "the process necessary for collecting, measuring, and disseminating performance information, and assessing measurements and trends to effect process improvement." When this is done continuously, the body of knowledge suggests, it will provide the project team insight into the health of the project and highlights any areas that require additional attention. Performance management of the hydropower construction controls the cost of the project, cost of penalties, loss of PPA escalation as well as the generation loss. From the investigation it has been explored that due to the time overrun, the cost of the project may rise up to double depending upon the circumstances. Therefore, performance assessment and its good implementation are mandatory for the cost control of any project. Even comparative performance assessment was done for building project in Nepal by using Economic, Social and Environmental indicator (Mishra and Rai, 2017).

Construction Management and Performance

There is a strong relation between project management and project performance. Management in construction industry is considered as one of the most important factor affecting the performance of works. The delays on the delivery of construction projects are seen as one of the most frequent problems in the construction industry (Kharashi and Skitmore, 2009). Construction management and performance are interrelated to each other as the good management of construction helps to enhance the performance of any project or construction. If processes can be identified in a project-based organization, and if the concepts of effectiveness can be applied to evaluate processes then it would be possible to evaluate the project management process over time in terms of performance (Zandhuis and Stellingwerf, 2013). Construction planning process through the process group is effective for achieving success of a project. The ultimate result obtained by overall management of construction is the enhancement in performance and increase in profitability and productivity of organization. Cheung *et al*. (2004) studied the project performance related to project managers. It is remarked that development of a Web-based construction Project Performance Monitoring System (PPMS) can assist project managers in exercising construction project performance indicators and can help senior project management, project directors, project managers, etc., in monitoring and assessing project performance. Pheng and Chuan (2006) stated that while project management is only one of the many criteria upon which project performance is contingent, it is also arguably the most significant as people formulating the processes and systems who deliver the projects. Ugwu and Haupt (2007) stated that an adequate understanding and knowledge of performance are

desirable for archiving managerial goals such as improvement of institutional transformations, and efficient decision making in design, specification and construction, at various project-level interfaces, using appropriate decision-support tools. Ling *et al*. (2007) investigated project management (PM) practices adopted by Singaporean construction firms and determined the performance level of their projects in China; identifies PM practices that led to better performance; and recommended key PM practices that could be adopted by foreign construction firms in China to improve project performance.

Construction Project and Performance

Success of construction projects depends mainly on their performance. One of the principle reasons for the construction industry's poor performance has been attributed to the inappropriateness of the chosen procurement system (Dissanayaka and Kumarasawamy, 1999). A project is a collection of activities to achieve a specific objective. Project management involves project planning, monitoring, and control: Project planning includes definition of work specification, determination of quantity of work, and estimation of resources required (PMBOK, 2000). The main problem of the construction projects are intervention of owners or stakeholders with traditional approach to project design, planning without consent of required professional and not using applicable guidelines of project management (Jekale, 2016). The standardization of the project management process contributes to disseminate best practices which implements and depicts a strategy to improve project performance (Muresan *et al*., 2010). Performance of construction project can be increased by well planning and scheduling of the project. Cheung *et al*. (2004) identified project performance categories such as people, cost, time, quality, safety and health, environment, client satisfaction, and communication. Navon (2005) obtained that the control system is an important element to identify factors affecting construction project effort. For each of the project goals, one or more Project Performance Indicators (PPI) is needed.

Pheng and Chuan (2006) found that human factors play an important role in determining the performance of a project. Ugwu and Haupt (2007) remarked that both early contractor involvement (ECI) and early supplier involvement (ESI) would minimize constructability-related performance problems including costs associated with delays, claims, wastages and rework, etc. Ling *et al*. (2007) obtained that the most important practice relating to scope management are controlling the quality of the contract document, quality of response to perceived variations and extent of changes to the contract. It was recommended for foreign firms to adopt some of the project management practices emphasized to help them to achieve better project performance in China. Based on our earlier study of Small hydropower projects of Nepal, Critical path method was popular for planning the project. Weekly meetings were preferred by client, consultant and contractor for monitoring of the project progress. The overall findings of 62.86 percent of parties involved in the project used to coordinate their current schedule with master schedule. 80 percent of client, consultant and contractor had the association of cost schedule with estimated time schedule. More than 74 percent of client, consultant and contractor did not use any software for planning, monitoring and controlling of cost of project. Furthermore, the safety factors were moderately used in construction project.

Also, 40 percent of meetings were conducted weekly for the safety issues and there were less number of trainings for the safety. Improvement in construction practice is required for ensuring the safety and timely completion of project within estimated budget (Mishra and Chiluwal, 2017).

Project Success and Performance

Over the last few decades, project success has been the main focus of the project management literature (Prabhakar, 2009). Project success and performance are interrelated to each other. In general, if the performance of the construction is high then the project is considered as successful. Performance is often identified as the ultimate dependent variable in the literature on organizations. It is currently the focus of much attention in the project management literature (Thomas and Mullaly, 2008). Organizational performance is a subjective construct. This construct is subjective because it exists in the minds of those who are evaluating. The organizational performance of PMOs will vary depending on who the evaluator is. Most of these stakeholders belong to different units that have different cultures and different values (Aubry and Hobbs, 2011). The success of project depends on the performance and the performance depends on the programs, portfolios, strategies of the company.

Al-Momani (2000) stated that the success of any project is related to two important features, which are service quality in construction delivered by contractors and the project owner's expectations. Managing the construction so that all the participants perceive equity of benefits can be crucial to project success. It is obtained that the complete lack of attention devoted to owner's satisfaction contributes to poor performance. Declining market shares, low efficiency and productivity, and the rapid construction cost escalation also lead to poor performance. Nitithamyong *et al.* (2004) remarked that the success of construction projects depends up on technology, process, people, procurement, legal issues, and knowledge management which must be considered equally.

Profitability Indicators and Uses

Profit is an excess of revenues over associated expenses for an activity over a period of time. Profitability means ability to make profit from all the business activities of an organization, company, firm, or an enterprise. Profitability is 'the ability of a given investment to earn a return from its use (Harward and Upton, 1961). Mainly, the profitability indicators help to find the status of company in terms of profit margin. Moreover, the use of profitability indicators is useful to analyze the status of that company. Generally profitability indicators are like gross profit, net profit, return on equity etc. However, the Profit is an absolute term, whereas, the profitability is a relative concept. However, they are closely related and mutually interdependent, having distinct roles in business. The research conducted in Nepal shows that the problem of price fluctuation occurs in an unpredictable manner. At least 27 % price was escalated of the construction inputs. Contractors lose their at least 52 % of the expected profit. Few contractors are planned to address for the future price escalated situation and remaining others are not concerned about the future situation. Price adjustment clause is not favorable for the contractors. The price fluctuation system that is in place is limited to few construction inputs. Moreover, contractors get compensation only for portion of the price increase of inputs (Mishra and Regmi, 2017).

Performance and Profitability

There is a strong dependent relationship between company performance and how the available resources are managed. For performance indicator Return on assets are identified some influence factors that through their common action can contribute to increasing or lowering of the profitability of the analyzed company (Burja, 2011). Performance and profitability are interrelated to each other. If the performance is high then the profitability of the company is also increases. The key areas to enhance the performance and profitability of the company are accountability, capabilities, coordination, direction, values, orientation, innovation, leadership and motivation (Smet *et al*., 2007).

Benchmarking and Performance

Tolosi (2000) defined benchmarking as a process which continuously measures the products, services and operational practices of a given organization to compare the organization's performance and operational practices with a selected sample group. In addition to create a basis for comparison, benchmarking is a good development tool because it enforces a self-critical approach, indicating the points of operation the company must improve. Li *et al*. (2001) stated that cooperative benchmarking should be used as a tool for achieving partnering excellence in construction projects. Benchmarking involves a comparative analysis between at least two parties in order to compare the current performance gap. Chan Albert and Chan Daniel (2004) defined benchmarking as the search for the best practices that will lead to superior performance of an organization. Augusto *et al*. (2006) stated that the effective performance cannot be achieved without challenges and obstacles. To meet these challenges and overcome these obstacles, an organization must have a clear understanding of its performance in relation to its competitors. To accomplish this task, an organization must have an organizational benchmarking system which is occupied with analytical models designed to measure multifaceted performance characteristics and parameters. Grigoroudis *et al*. (2006) studied the assessment of user-perceived web quality and used application of a satisfaction benchmarking approach. The benchmarking analysis consists of the following parts: (1)the user satisfaction analysis which concerns the identification of customer preferences and includes the estimation of the relative importance, and (2) the satisfaction benchmarking analysis which is mainly focused on the performance evaluation of the competitive organizations against the satisfaction criteria. The results presented how business organizations may locate their position against competition, reduce their weak points and determine which characteristics will improve their global performance. This gives the ability to identify the most critical improvement actions and adopt the best practices of the industry.

MATERIALS AND METHODS

Study Area

Small hydropower projects either already constructed or in under construction phase are selected for the study because in comparison to the medium and large project, smaller project have fewer constrains and are easy and fast for the study, design and construction. Though every project is unique in nature, smaller projects have less issue, small scale of hindering factors and confined volume of construction parameters. Government and foreign investors have no interested in small scale projects, so it will be the project developed by the private developers. The project developed by the private developer has also been chosen because the history of the hydropower construction has shown that the cost of hydropower project developed by private developer is lesser than Government and other foreign investors. For the study purpose, Upper Hugdi hydropower project and Bijaypur Khola hydropower project has been chosen because both the project are in operation phase and developed by independent power producers.

Upper Hugdi Khola Hydropower Project

This project is located at Gulmi district of Western region. It is a run-of river type of hydropower project with installed capacity of 5.0 MW. Project gross head is 186 m and design flow (Q40) of 3.75 m3/sec passes through 217 m approach canal, 1150 m headrace pipe of diameter 1.35m and 2200 m of penstock of diameter 1.30 m. The major structures of projects are weir, settling basin, anchor block, surge shaft, powerhouse, tailrace, switchyard, and 12 km long 33 kV transmission line. The surface powerhouse of project has 3 generating units of 1700 kW Francis turbine.

Bijaypur Khola Hydropower Project

This project is located at Kaski district of Western region. It is a run-of river type of hydropower project with installed capacity of 4.5 MW. Project gross head is 67.9 m and design flow (Q40) of 8.3 m3/sec passes through 315 m approach canal and665 m long penstock of diameter 2.4 m. The major structures of projects are weir, settling basin, anchor block, surge shaft, powerhouse, tailrace, switchyard, and 6 km long 33 kV transmission line. The surface powerhouse of project has 3 generating units of 2350 kW Francis turbine. It is clear that most of the clients do not provide the data related to the financial matter. Due to convenience of data accessibility, these two projects were selected as case studies for study of performance in terms of time and cost and its impact on profitability of the project. All 38 projects are under construction that has followed the same method for the study, PPA with NEA, financial management, selection of contractors.

Research Approach

Qualitative as well as quantitative research approach has been used since the collected data were analyzed and presented with proportions and means according to the nature of the data.

Method of Data Collection

Both primary and secondary data were required for the fulfillment of the purpose of this research. Primary data has been collected by field visit and interview of the personnel related to the project. Technical, financial and other related data has been collected from their corporate office from Kathmandu. The opinion of the experts has been taken as key informant interview with the project manager; finance head and site engineer of both selected projects to find out the practical problem associated with the construction performance. Also, the opinion of people who were directly involved in project activities was taken by the focused group

discussion to evaluate the impact of project in society and the impact on performance by the social issues.

Primary Data

Key Informant Interview (KII)

The KII was based on the snowball sampling. This interview was taken by meeting the expert of related field. Five experts were chosen for the KII and all of them had experience of more than ten years in the hydropower sector. Moreover, for the information of Upper Hugdi hydropower project and BijaypurKhola hydropower project, KII has been done with the project manager, site engineer and finance head of the project.

Focus group Discussion

Focus group discussions were conducted at project site of Upper Hugdi Khola hydropower project and Bijaypur Khola hydropower project. There were two focus group discussion held in each project site. The objective of the focus group discussion was related to the role of society for the construction performance.

Secondary Data

Secondary data were collected from the corporate office of the project. Secondary data required for the research was the financial data of the project. These data were collected from the project office at Kathmandu.

Data Analysis

To find the Cost Performance Index (CPI) and Schedule Performance Index (SPI) following formula were used.

$$\text{CPI} = \frac{\text{BCWP}}{\text{ACWP}}$$

Where,
BCWP = Budgeted cost of work performed
ACWP = Actual cost of work performed

$$\text{SPI} = \frac{\text{BCWS}}{\text{ACWS}}$$

Where,
BCWS = Budgeted cost of work scheduled
ACWS = Actual cost of work scheduled

For finding the financial parameters of the projects, the data related to the expenses of the project had been collected from their respective project office. The economic evaluation of the project estimated and impact of performance on IRR, NPV, BC ratio and RoE have been calculated by using the formula.
Internal Rate of return (IRR)

Cash flows year1/(1+IRR)^1 + Cash flows year2/(1+IRR)^2 + Cash flows year n/(1+IRR)^n – Initial Investment = 0

Net Present value (NPV)

Investment + CF1/(1+K)^1 + CF2/(1+K)^2 + ∑CFt/(1+K)^t

Benefit cost ratio (BC ratio)

= Discounted value of incremental benefit / Discounted value of incremental cost

Return on equity (RoE)

= Net income / shareholder's equity

Payback period (PBP)

= Initial investment / cash flow per period

RESULTS AND DISCUSSION

Performance of Hydropower Projects

Table 1 shows the performance of two different hydropower projects in terms of time and cost. These projects are developed by different developers.

Table 1. Time of completion of project

S.N	Project Name	Estimated construction time (Month)	Actual Construction Time (Month)	Difference in time	Remarks
1.	Upper Hugdi Khola Hydropower Project (5.00 MW), Gulmi	30	24	(6)	Construction completed earlier
2.	BijaypurKhola Hydropower Project (4.50 MW), Kaski	18	24	6	Construction completed later

Table 2. 1Cost of completion of project

S.N	Project Name	Estimated cost with IDC (NRs.)	Actual cost with IDC (NRs.)	Change in Cost	Remarks
1.	Upper HugdiKhola Hydropower Project (5.00 MW), Gulmi	814,921,000.00	749,400,000.00	65,521,000	Cost surplus
2.	BijaypurKhola Hydropower Project (4.50 MW), Kaski	648,550,000.00	758,564,000.00	(110,014,000.00)	Cost overrun

The table 1 shows two different projects in which one project, Upper Hugdi Khola hydropower project, 5.00 MW was completed earlier than the estimated time of the project where as another project Bijaypur Khola Hydropower Project, 4.50 MW took additional six months to complete the construction. The change in estimated time of the project has its direct effect on the cost of the project.

Upper Hugdi KHola Hydropower Project, 5.00 MW, Gulmi

Construction time for Upper Hugdi Khola Hydropower Project was estimated for thirty months. The estimated time was calculated according to the quantity of project and its accessibility. At the time of project construction, the team of Client, consultant and contractor performed well so that no any hinders and problems affecting construction progress were raised. Another factor for project completion before time is social balance of project affected area. No social problem rose during construction and management of cash flow in project development phase. However, the overall management of the

project was also good and allocation of the right and authority was proper so that the decision making in any field was made easy. Moreover, there was a strong technical team from client so that the coordination with the consultant and contractor was also better to enhance the progress of project. On the other hand, the company has issued the promoter share to public of affected area. The result of that is the main cause to control the public harshness to the project site.

BijaypurKholaHydropower Project, 4.50 MW, Kaski

Construction time for Bijaypur Khola was estimated for eighteen months. This was based on the quantity of project and its accessibility. The time of project was extended due to cash management and social problems. Social problem was one of the major factors for the extension of time. However, the coordination of team involved in the project was not found good. On the other hand, there was lack of strong technical team from the clients' side so that the decision making related to the technical issues at project were not solved immediately. The fluctuation of rate of construction materials at the time of construction also played vital role to extend the time. Moreover, there was less or null involvement of major public as a promoter share holder so the main cause of public harshness was due to the lack of involvement of public as a promoter. Capacity of both the project seems to be equal but the estimated construction time is different. Projects are unique in nature so the construction time of project does not depend only at the capacity of project. Findings of Key Informant Interview (KII) here have shown the difference in project construction time.

The Table 2 shows the impact of time overrun on cost of the project. Estimated cost of Upper Hugdi Khola Hydropower Project was NRs. 814,921,000.00 but the project was completed earlier than estimated time saving NRs. 65,521,000.00 of total project cost. There may be many other factors to save the cost of the project but major one is time. On the other hand, the project cost of Bijaypur Khola Hydropower Project has been increased by NRs. 110,014,000.00. The main cause which leads to increment of cost is time overrun. However, there may be other factor which may associate for the increment of cost. Moreover, the variation in the quantity is also the major factor to increase the cost. There was no any variation in quantities in Upper Hugdi Hydropower Project whereas there was variation in civil and hydro mechanical quantities of Bijaypur Khola hydropower project. The cost performance index of Upper Hugdi hydropower project is 1.09 which indicates the actual cost of the project is less than the estimated cost. The cost variance of same project is 7.5%. Moreover, the schedule performance index of this project is 1.25which represents the project is completed before the estimated time.

Furthermore, the cost performance index of Bijaypur Khola hydropower project is 0.89 which indicates the actual cost of the project is more than the estimated cost. The cost variance of same project is 17.0%. Moreover, the schedule performance index of this project is 0.75 which represents the project does not completed on time. Due to the increment of project cost, loan and equity ratio of project may vary than the actual estimated. If, overall project cost is increased then the equity portion of the project should be managed by developer. At that time, it may take long time to manage the additional equity for the developer so that it directly hit the performance of any project. The cash flow management is one of the most important parts of any construction project. Whenever there is increase in project cost, the cash flow of the project cannot be easily managed. The result of that also increases the cost of any project. Moreover, the time overruns and its effect on cost overrun directly affects the financial parameters of the project. Financial indicators changes accordingly with the change in cost. Also, the developer miss the escalation in PPA rate every year up to the commercial operation of project.

Impact of performance on profitability of project

The result of the impact of performance on profitability is presented in Table 3.

For Upper Hugdi Hydropower Project, 5.00 MW

Table 3. Financial indicators of UHHPP

S.N	Parameters	Estimated	Actual
1	IRR	15.18 %	13.42%
2	NPV	243,691,000	179,460,000
3	BC Ratio	1.38	1.22
4	EIRR	23.59%	18.22%
5	PBP	5.03 years	6.58 years

Even though the project is completed on time but the financial parameters of the project are also decreasing due to the change in generation than estimated. It happens because of the hydrological analysis of the project. As the hydrology of the project is overlooked at the time of hydrological analysis. Moreover, only this analysis is not responsible for the revenue loss. Rather than this, condition of transmission line and trip of voltage at the time of operation. The transmission line is 13 km long and disturbance at transmission line is also the factor influencing the loss in revenue. This project is completed on time but the NPV of project decreases and the IRR and RoE of the project are also decreases. BC ratio of the project decreases from 1.38 to 1.22. The decreased BC ratio is also greater than 1 so the project is capable of giving profit to its shareholder and PBP of the project also increases from 5.03 years to 6.58 years.

For BijaypurKhola Hydropower Project, 4.50 MW

Table 4.2 Financial indicators of BKHEP

S.N	Parameters	Estimated	Actual
1	IRR	16.75 %	12.82 %
2	NPV	310,824,000	257,260,000
3	BC Ratio	1.55	1.06
4	EIRR	23.65 %	15.87 %
5	PBP	5.33 years	6.39 years

Table 4 clarifies that the time overrun due to performance of construction highly decreases the profit margin of project. Due to the increase in time by six months the project NPV has decreases and the IRR and RoE percentage are also highly decreases. BC ratio of the project decreases from 1.55 to 1.06. Due to the time overrun, the cost of the project been increased and IRR as well as BC ratio of the project decreases. IRR of the project is still greater than the interest of bank so the project is capable to pay EMI for bank. Also, the BC ratio of the project is more than 1 so the shareholder can able to get the profit. The PBP of the project also increases due to the change in financial parameters.

Conclusion

Upper Hugdi Khola hydropower project was completed before 6 month and the saving in the cost was NRs. 65,521,000 but the financial indicators of the project decreased than prior estimated because of the generation loss of the project at the time of project operation. Many other external factors were there to lag the performance of the project. Only the save in time and cost does not necessarily increase the profitability of project. On the other hand, Bijaypur Khola hydropower project had taken additional 6 month and NRs. 110,014,000 to complete the project. Due to the time and cost overrun of the project, the financial indicators of the project decreased.

Recommendation

Performance problem is costly and often result in disputes, claims and affect the development of the construction industry. The construction organizations must have a clear mission and vision to formulate, implement and evaluate performance. The environment of construction organizations should be proper to implement projects with successful performance. It is important for construction organizations to identify the weaknesses of performance in order to solve and overcome.

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