Study On Labour Productivity of Construction Projects in Bihar

Shikha Kumari

Research Scholar, Department of Economics

B. R. A. Bihar University, Muzaffarpur

ABSTRACT

Construction sector is the most vibrant and dynamic sector in the country's economy. This sector in India is contributing more than that of agricultural sector, although India is an agrarian country. Probing in deep it comes to the picture that this sector has not been deployed till now to its maximum capacity. This means still there is lot of potential in this field that has been still in unexplored category. The major advantage of this sector is that it can be further categorized into subsectors. Field can be divided based on the resources that are present for us to be used in this sector, for example labour, material, machinery, finance and many more. Since we are not able to get efficiently productive production here in India, this means there may be some kind of lagging on our part that we are not able to rectify as we are having best of machines, financial assistance, expertise but still we are lagging somewhere. This means there are some other things that are responsible for the failure of the project at site to give efficient productivity. This study has tried to focus on one such subsector that is labour to improve on so as to increase its contribution to the overall productivity. Labour's productivity primarily focuses on the labourer's part on how they work, how they are recruited, how the things seem to them. The main thing is the way to improve the labourers' productivity. Here the focus is to study the literature related to this topic and then by taking a real time project in order to find their efficiency gap. Lots of methods have been provided till date in order to find the labour productivity. In this study three methods has been used to find the inefficiency and this gap has been tried to reduce down by providing the suggestive model to be used in construction organization related to the labour selection criteria. Since this sector is one of the major components of secondary sector in our economy therefore in order to further attract FDI and to increase the domestic growth this sector can prove to be the golden sector in the whole economy.

Keywords: Productivity, Motivational, Skills, Construction, Motivational leadership, sustainable, Infrastructure

Introduction

Construction is one of the most challenging and very large sector. After having world-class equipment and highly skilled labour and even high technology the end productivity when checked results out to be very less than expected. So what is that thing that even after having "the best" of everything hinders the way of 100% productivity and efficiency? The answer to this tough question is not very complicated and the answer is "labour productivity in the field".

Precisely talking about the labour productivity that summarises to talking specifically about the key resource inofany in construction project. In the construction industry, We generally assume all resources as having equal weightage but the important thing in all aspects are not similar in the context that some of the mare arguably having more weightage than others or in another context that with the absence of those more significant ones, we will be unable to allocate rest of the resources in an optimized manner. For every project, "productivity, cost, quality, and time" have been the major limiting factors as well as having more importance in the construction. It is a wrong hypothesis to talk about only labour being the main governing factor or machinery to be used being the main factor to be concerned because all the resources/materials are in close proximity to one another. As we are the one to be the emerging global leaders of the world, we have to optimize the best practices for resource utilization in the construction industry, but the fact is that still if we are limping behind

anywhere then that is the lack of optimized ways of labour utilization.

Manpower is the top and foremost valuable asset in construction. Man power productivity reflects the role of labour with that of the economical aspects and output of the project. Prolificacy is the rate of having an optimized outcome of the inputs to gain desired objectives. An increase in output capacity of manpower prolificacy correlates itself with profit margins, competitiveness, achieving the key shareholder's propositions as well as long-term goals of growth and to secure the productivity of a company sustainably and to the nation too." completion."

increased labor output

less conflicts in supervisors and site engg.

faster rate of construction

less load on the project manager

ontime completion of all activites

cost effective project

nearly 100% efficiency obtained
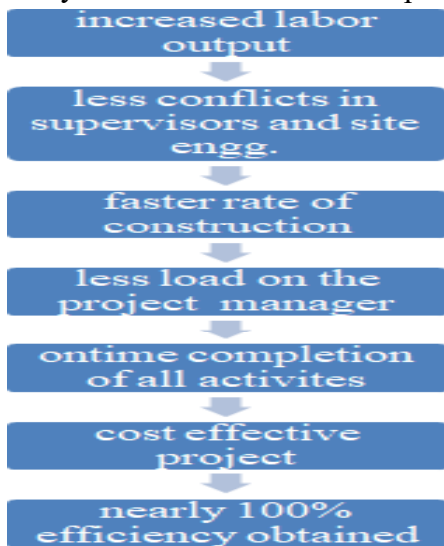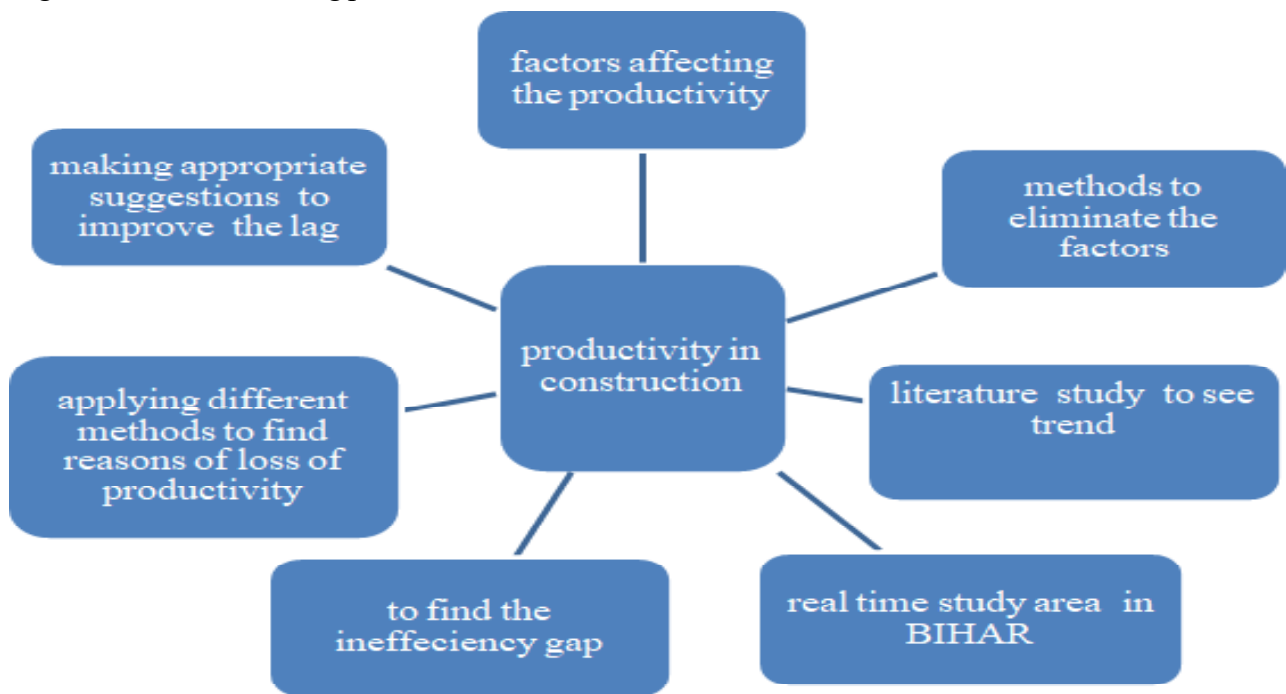
Fig1.1Scheme for increasing productiveness of labour

The main motto of the research is to limit the work in the field to the productivity of the construction projects. So the main motive is to improve the productivity (output) in a project with minimal wastage of resources and in an optimized way by studying the construction works being carried out in the BIHAR state of India, to have a Broad perspective of the deficiencies of any construction works carrying out in this region.

The outcomes thus concern with various parameters whose completion can wave a path to the finalization of the goal of the research.

• To understand the importance of productivity in the construction Industry.

• To find out the factors that affects the real performance of the productivity and the projects.

• To see the regional trend of using resources.

• To find out the reasons for the gap in the productivity in the region

Productivity is defined as the yeild of any industrial process. It is defined as the rate at which an industry yields product and services. Productivity in technical terms can be given as the "ratio of the quantity of input to the quantity of output".

factors affecting the productivity

making appropriate suggestions to improve the lag

methods to eliminate the factors

productivity in construction

applying different methods to find reasons of loss of productivity

literature study to see trend

to find the ineffeciency gap

real time study area in BIHAR

Productivity is defined as the yeild of any industrial process. It is defined as the rate at which an industry yields product and services. Productivity in technical terms can be given as the "ratio of the quantity of input to the quantity of output".

Input can be difined as in terms of working hours and the minimum value is defined as the amount entered at the completion of the project. Production requires more staff. Measured as working hours per unit of work.

The objectives described above also reflect the productivity of any project and the main features are:

● Production
● Cost
● Quality of Product
● Time of Completion

Analysis is of the impact of productive impact on building materials is one of the modes of production model.

Significance of the productivity is as follows:

● Observing Construction Industry Trends
● To differentiate the Performance
● To see the effect on scheduling of different activities in a project.

Important References to look at:

The references that can be helpful while researching the lack of the productivity in a project:

● Contractual files
● Weekly/Monthly/Yearly Construction Progress reports
● Project Metadata
● Time schedules

Indispensability of the Research

For understanding the productivity of the project we need the following three things:

● Accurate data (past record)
● Consistent data (without any missed data in between)
● Comprehensive data (correlated data)

Production is a necessity for all projects in the construction industry. Without sound production, every project is worthless. As the construction industry emerges in our society, we know much that comes only from this concept of architecture. These are the productivity of the project, the value of the project time, the value of the staff, as well as the importance of the management of the construction company. With continued growth in the field of innovative and effective research in the construction industry, replenishing these costs for efficient materials is the only way to produce good quality and healthy products. It is becoming more and more important.

This created the need to increase production in the construction industry. If you are using the best equipment and methods, but your project's productivity growth remains low, this issue has become a hot topic in the construction industry.

The concept of growth of this product is very helpful in distinguishing between healthy and bad projects. To achieve this goal, we always focus on our weaknesses and strive to do it on a much larger scale. Here are some examples of studies that explain the work of our researchers and students in construction management. Some of their hopeful works are summarized below.

For any nation's economy to grow, construction productivity is very important and plays a significant role in the industry (Naoum 2016). The construction industry serves significantly as a source of employment and makes a remarkable contribution to the performance of the overall economy (Giang and Pheng 2011). Labour is known as the most crucial and flexible resource used in construction projects and construction productivity is directly related to labour (Muqeem et al. 2012). Construction projects hire a large number of workers, thereby, it can be stated that manpower is the dominant productive resource; therefore construction productivity is highly dependent on human effort, efficiency and performance.

There are several definitions provided of productivity by different researchers. The term 'productivity' is generally defined as the maximization of output while optimizing input (Naoum 2016; Durdyev et al. 2018). Henceforth, it is known as a measure of the ratio between an output value and an input value used to produce the output (Borcherding 1977; Ameh and Osegbo, 2011; Durdyev and Mbachu 2011; Jang et al. 2011; Ibbs 2012; Jarkas and Radosavljevic 2013; Gundecha 2013; Yi and

Chan2014; Rami Huges 2014;Robles et al. 2014;Shashank et al. 2014; Naoum 2016; Sveikauskas et al. 2016; Dixit et al. 2017; Durdyev and Mbachu 2018; Ohueri etal. 2018; Alaghbari et al. 2019; Ayele and Fayek 2019; Dixit et al. 2019; Shoar and Banaitis 2019; Zhiqiang et al. 2019). The output consists of products or services and the input consists of materials, labour, capital and energy (Drewin 1982).

A low level of productivity is one of the most challenging concerns faced by the construction sector (Jarkas and Bitar 2012). Construction industries in many countries across the world are greatly concerned about the low level of productivity (Lim and Alum 1995; Egan1998; Ayele and Fayek 2019). A low level of productivity is dangerous and causes inflationary pressure, social conflicts and mutual suspicion in the nation's economy (Drucker 2012; Dixit et al. 2019; Shoar and Banaitis 2019). By acknowledging the factors that cause low CLP, project managers can address the problems at an early stage, thus minimizing the time and cost overruns (Kaming et al. 1997; Kaming et al. 1998; Abdul Kadir et al. 2005; Palikhe et al. 2019; Seddeeqet al. 2019). The CLP significantly influences the profitability of construction companies; however, CLP exhibits the highest variability among project resources and thus, a major source of project risk (Tsehayae 2015). Labour in projects is also the most difficult element to define, manage and quantify the impact. In this sense, it remains important to determine the factors affecting labour productivity to manage the labour force effectively (Kazaz and Acikara 2015). Understanding critical factors that affect CLP can help to develop strategies to reduce inefficiencies and to more effectively manage construction labour forces. This will not only improve the project performance of construction companies but also make them more competitive and consequently increase the chances of survival within this highly competitive sector (Ailabouni et al. 2007; Robles et al. 2014).

The major objective of this study is to review the research carried out to date on the identification of the factors related to CLP. A thorough literature review was conducted using available scientific databases to identify the factors related to CLP and rank them according to their importance as mentioned in different studies. The methods used for CLP estimation from the factors are briefly discussed and recommendations are made for the improvement of CLP. The findings of the study can be used, not only by academics, who are interested in the effect of the subject matter on the construction workforce but also by both local and international industry practitioners, who may be further keen to venture into potential mega-scale projects. The study can help construction project management to develop a wider and deeper perspective of the motivational factors impacting the performance of skilled operatives and to provide project managers with guidance for focusing, acting upon, and controlling the critical factors influencing productivity. Thus, the study would assist in achieving efficient utilization of the workforce, and a reasonable level of competitiveness and cost-effective operation.

Construction is among the utmost chance availing industry. The quality of being productive in terms of labour performance plays a vital role in determining the outcome of the construction project. Labour wages generally bestow 40 to 60% of the entire project cost in projects. Thus productivity melioration help reaches higher cost savings with minimal investment. Achieving better labour productivity needs an elaborate canvas of the actual labour cost. For all project productivity, monetary value, quality, clip and many more components that vary from site to site have been the main concern. Thus better productivity can be attained via project management, which includes the science of pedagogy and training, the work method, personal wellness, motivational factors, the type of tools, machines, required equipment and materials personal skills, the workload to be executed, expected work quality, work location, the kind of work to be performed, and supervisory personnel. This paper gives a detailed study regarding labour productivity such as its definition, its types, different factors affecting it, and different methods used for its analysis.

Diverse studies had been done on this topic as this topic has become a hot focus area for researchers. This area catches everything that comes under the

sun in this field. A lot of studies had been concluded in different parts of the world in this regard yet India is lagging in this case. To get an idea about the study in India this study focuses on the Kerala state to look at the trend of labour- productivity.

Elements pointed out to have a critical effect on Construction productivity:

1. Accessibility of stuff on time at the worksite
2. Material conveyance lags
3. Political lockouts
4. Alteration of the plan, ensuring additional work
5. Detain the handiness of drawings at the worksite.

The result is that a large no. of factors comes to the light which should be considered while studying this area. The main factors are listed above

The construction industry in this country at times adds over 10% of the national Gross Domestic Product and gives employment to lakhs of people (Planning Commission, 2008).The importance of providing jobs to the construction industry in the coming year will have a very high impact.

To get an idea of what is happening exactly in this industry we need to compare the old data or the data of another project with other projects. Recently institutions and industries calling for productivity growth suggest a grave need to get the measures of productivity levels right. Other studies highlighted, that less than 50% of the industry measure and monitors productivity levels, with a majority of those companies that claim to measure go about measuring based on the intuition of key site management personnel. Seems like the methods to finding productivity are somewhere lagging to finding exactly what is desired. This paper reviews the methods of productivity measurement available and describes two studies conducted during this research, intending to report the problems, and issues faced when trying to set productivity levels at a project level.

Measuring productivity enhancement in construction is considered a challenge. This study reflects the first results from a Bureau of Labor Statistics research group convened to measure construction productivity. Findings show labour productivity growth as positive and fairly substantial, in all four industries. Shifts of labour between construction industries lessen productivity growth by 0.45% a year. Regulation in the industry reflects a significant negative on productivity but lessens productivity growth by only 0.15% a year. Undocumented immigrants are important in construction, and often work off the books, but reasonable allowance for their increased presence reduces productivity growth by only 0.1% a year. The influences examined are not sufficient to explain why productivity growth is so much lower in construction than elsewhere. Further work needs access to restricted Census micro data, and so will take much more time to accomplish.

The purpose of this paper is to examine the degree of productivity change in the construction industry and relate these changes to variations in the business cycle. Productivity change is estimated by creating a bilateral index using data envelopment analysis, complemented with boots trapping. The results showed that Spanish firms in building construction experienced a fall in productivity because of a decline in technical and scale efficiencies, despite improvements in technology. The productivity change in civil engineering and specialized construction also was negative; however, the source of this decline was technical regress and negative scale efficiency change, although efficiency change and technology scale change contributed positively. The results further revealed that the firms reacted to the financial crisis of the late 2000s by introducing technological change, although the productive, technical, and scale efficiency changes all were negatively impacted during the economic downturn, suggesting underuse of resources. The rate of growth of construction productivity in Europe, the United Kingdom, and the United States became an issue in the late 1960s when declining growth in output per hour worked and output per person employed became the focus of a large research program (Allen 1985). Despite efforts over the past few decades in several countries, the rate of measured growth of construction productivity has remained low compared with many other industries. The possible reasons behind this stagnant growth of productivity are varied and could include such causes as the industry's high labour intensity, low economies of scale, and a lack of competition.

Regression and neural network modeling techniques are presented for quantitative evaluation of the impact of multiple factors on productivity. The methodology applied to generate productivity models for various activities at the site. This task of identifying a mapping function from the independent variables to the dependent variable is analogous to that performed by some of the neural network models such as back-propagation. In the common use of neural network models, on the other hand, apart from the choice of neural network architecture (which constrains the class of the models or the functions that can be learned), the user does not need to exert much effort to decide about the class of relationships. However, it must be highlighted here that many neural networks, and approaches to model fitting are closely related to their statistical counterparts. A pragmatic approach, therefore, is to use a mix of tools and techniques drawn from both neural network sand statistical approaches for complex real-world applications such as construction productivity modeling, which is the focus of this study.

Based on the literature survey, the following factors have been identified which may affect "construction labour productivity". The following factors are similar to the one where my study site is, that is the Bihar state of India. These factors are mentioned below:-

1. Environmental factors
2. Material availability
3. Safety
4. Quality
5. Manpower
6. Time available
7. Motivational leadership
8. Political Party's Strikes
9. Frequent rescheduling of the work plan
10. Local workforce shortage
11. Contractors Financial condition
12. Irregular policies of the state.
13. Seven days a week work schedule
14. Lack of past record/data
15. In consistent available data
16. The manual collection is time-consuming

Conclusion:

The construction sector is very large and most powerful industry in the world. Materials, work, methods are always changing here. To be in the race for the developed world this industry needs to be very strong. To date we have come up with a variety of ideas and strategies to improve the efficiency of our nation in this regard.

In this study the main focus is on high productivity of workers. We are trying to find new ways to make it in the race for developed countries. This labour-intensive production is not just one concept but can solve many other problems such as unemployment, illiteracy, improved living standards without technological advancement.

Some new techniques have already been developed and researchers are still working on new ideas. The best strategies are focused on this report and the scope of the future and the benefits of making it easier to understand more.

All in one, we can conclude by saying that a new perspective and direction may elevate the infrastructure industry to a higher level. Therefore, to continue the prosperity of our country in sync with the growth of technology in the construction industry.

By applying the method of product growth in the field of construction, we can achieve the goal of building efficient and sustainable infrastructure. At a given moment, time of completion of project is one of the most critical things that can elevate a project to great success or make the project suffer as a result of fines. These factors may put a strain on the future of those who own the projects. So using new software and platform strategies that are faster and more efficient can save us time in planning and can also work in our most vulnerable areas.

Therefore our completed projects will be 100% guaranteed, at the time of completion, there is no product density and adorn the construction sector. This can lead to an increase in clients thus increasing investment in not just one project but in many.

References:

1. Construction Labor Productivity and its Improvement Mr.C.Thiyagu (Student), Mr.M.Dheenadhayalan Guide

2. Factors Constraining Labour Productivity: Case Study of Turkmenistan Serdar Durdyev1, Syuhaida Ismail11 and Nooh Abu Bakar11 Razak School of Engineering and Advanced Technology, University Technology Malaysia, International Campus, Jalan Semarak, 54100, Kuala Lumpur, Malaysia.

3. Productivity and Efficiency in the Development of the Swedish Construction Sector Anne Landin1, Mats Öberg2 1Department of Construction Sciences, Lund University, Lund, Sweden2 Department of Building and Environmental Technology, Lund University, Lund, Sweden

4. A Case Study of Construction Productivity after the 2011 Christchurch Earthquake in New Zealand Kelvin Zuo1, Suzanne Wilkinson2, Jeff Seadon3

5. Optimal Productivity in Labor-Intensive Construction Operations: Pilot Study Krishna P. Kisi1; Nirajan Mani2; Eddy M. Rojas3; and E. Terence Foster4

6. Construction Productivity Measurement: A comparison of two Case Studies Paul Chan1 and Ammar Kaka21 Salford Centre for Research and Innovation in the Built and Human Environment (SCRI), University of Salford, Bridgewater Building, Salford, Postcode M7 1NU, UK2 School of the Built Environment, Heriot-Watt University, Edinburgh Campus, Edinburgh, Postcode EH14 4AS, UK

7. Productivity Growth in Construction Leo Sveikauskas1; Samuel Rowe2; James Mildenberger3; Jennifer Price4; and Arthur Young5

8. Productivity Growth and Business Cycles: Case Study of the Spanish Construction Industry Magdalena Kapelko1 and Malcolm Abbott2

9. A Case Study of Construction Productivity after the 2011 Christchurch Earthquake in New Zealand Kelvin Zuo1, Suzanne Wilkinson2, Jeff Seadon3

10. Measuring the Construction Industry's Productivity Performance: Critique of International Productivity Comparisons at Industry Level Bernard Vogl, Ph.D.1; and Mohamed Abdel-Wahab, Ph.D.2

11. Optimal Productivity in Labor-Intensive Construction Operations: Pilot Study Krishna P. Kisi1; Nirajan Mani2; Eddy M. Rojas3; and E. Terence Foster4

12. Measuring the Construction Industry's Productivity Performance: Critique of International Productivity Comparisons at Industry Level Bernard Vogl, Ph.D.1; and Mohamed Abdel-Wahab, Ph.D.

13. Productivity Forecasting of Newly Added Workers Based on Time-Series Analysis and Site Learning Hyunsoo Kim, S.M.ASCE1; Hyun-Soo Lee, M.ASCE2; Moonseo Park, M.ASCE3; Changbum R. Ahn, M.ASCE4; and Sungjoo Hwang, S.M.ASCE

14. Productivity in Construction S.P. Dozzi, P.Eng. and S.M. AbouRizk, Ph.D., P.Eng. Construction Engineering and Management Civil Engineering Department University of Albert Institute for Research in Construction National Research Council Ottawa, Ontario, Canada

15. Labor productivity-analysis And Ranking B. Prakash Rao, Ambika Sreenivasan, Prasad Babu NV 1 Prof senior scale, civil department, Manipal Institute of Technology, Manipal, India 2 Student (Mtech), Civil department , Manipal Institute of Technology, Manipal, India 3 DGM (Projects), Brigade group, Bangalore, Karnataka, India

16. Brent G. Hickson & Leighton A. Ellis "Factors affecting construction labor productivity in Trinidad & Tobago" The Journal of the Association of professional Engineers of Trinidad & Tobago ISSN 1000 7924, vol.42, No.1, April/ May 2014, pp.4-11.

❖❖❖