The Impact of Labour Motivation on Project Performance with an Insight into the Sri Lankan Construction Industry

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ABSTRACT

Construction labour is a vital resource in the construction industry as they mostly reshape the raw materials into skyscrapers and other living enclosures. In Sri Lanka, the construction industry has been constantly exposed to many uncertainties and challenges. Being a developing country that lead to many socio-economic issues and constant changes in the living standards caused demotivational impacts on the Sri Lankan labour force. Thus, optimizing labour productivity through labour motivation is a significant challenge due to the various category and type of labours. This study aims to identify and evaluate different labour motivational factors in improving the building construction project performances. In accomplishing the aim, the mixed method approach was used and 5 number of interviews, 39 questionnaire responses were taken into the analysis. After the analysis there were 14 most significant labour motivation factors which applicable for Sri Lankan building construction industry. Cost centers for those were collected from the expert interviews and their cost on motivation factors were analyzed the data collected from the questionnaire. After the analysis financial and time cost centers have been identifies as the major cost centers that have been incurred when implementing labour motivational factors. Moreover, checked the association between labour motivational factors and project performance in terms of time saving, cost saving and quality improvement. As a result, they were associated with them. A framework was developed to aid in the selection of best motivational factors in optimizing project performance. As the last part of this study, the motivational recommendations were made to increase the labour productivity. Furthermore, these findings will be useful in optimizing building project performance.

KEYWORDS: *Labour motivation, construction industry, project performance, Sri Lanka*

1 INTRODUCTION

The construction industry plays a significant role in the economy and its growth in locally as well as globally (Export Development Board, 2021). According to Trading Economics (2022), the GDP contribution from construction in Sri Lanka was LKR. 143 035 million (Gnanothayan and Kauškale, 2022). Nowadays, the construction industry in Sri Lanka has been severely impacted by the country's current economic crisis. As a result of these circumstances, the construction industry is dealing with a slew of issues, including material price increases, labor shortages, project delays, and cost overruns. Considering the current economic crisis in Sri Lanka, many construction workers have left their jobs due to poor motivational management by their employers or supervisors. Apart from that, there were strict health guidelines practiced by the construction companies such as confining the workers to site in bubbles, limiting their involvement in entertainment programs as result of the COVID 19 pandemic. Those were also impacted in losses of labour's jobs in return (Vithana et al., 2020; Pathirana, 2020). In literature, labour is defined as "a task that requires the exertion of body and mind or both" (Olabosipo & Ayodeji, 2011). The motivating construction workforce is the best way of achieving higher productivity and completion of works at given timeframe without any delays (Widanagamachchi, 2013). Furthermore, many researchers have identified a number of labor motivational factors that are vital to maintaining project performance through proper labor handling (Osabiya, 2015; Khan, 2012; Chigara and Moyo, 2014; Halwatura, 2015; Widanagamachchi, 2013). The aim of this research is to identify and evaluate different labour motivational factors in improving the building construction project performances. The 4 objectives are to identify the labour motivational factors; to determine the cost of deployed different motivational factors; to investigate the impact of identified motivational factors on

the project performance; and to develop a framework on utilizing the above identified factors to optimize the building project performance. The study is confined to building construction projects in Sri Lanka.

2   LITERATURE REVIEW

According to Tucker, (1986) identified that the construction sector is one of the largest and most challenging industry in the world and it contributes significantly to countries' gross domestic product (GDP). Looking towards the Sri Lanka, the construction industry is the fourth largest sector in the local economy, accounting for 6-7% of the country's GDP over the last decade. (Jayalath and Gunawardhana, 2017). Umar, (2020) further identified that the construction industry is rapidly expanding in various developing countries like Sri Lanka and is consequently acknowledged as a major source of employment in the country.

2.1 Productivity and Labours in Construction Industry

Labor is the most significant factor in the construction industry because it integrates all other resources in construction projects (Prachi R. Ghate, 2016). However, there are some common issues in the construction industry such as time overruns, cost over runs, substandard quality mainly resulted by poor efficiency (Halwatura, 2015). Improvement of construction labour productivity is vital to expedite the construction of project within the budget while maintaining the quality. As per Idris Jajri, Rahmah Ismail (2010), expanding human capital acquisition among the population is a means of strengthening competitiveness by raising worker productivity and producing higher-quality products at reduced production costs. The lot of researchers have defined labours as "a task that requires the exertion of body and mind or both" (Fagbenle, 2011). In further study the labour has categorized into two part as skilled labours and unskilled labours. Some of the skilled labours in this category are masons, plumbers, carpenters, electricians, painters, scaffolders and tilers. Unskilled labours are defined as that is not required special skilled for the operations. (Moselhi and Khan, 2012). Moreover, human resources have become the most significant factor in project completion owing to the fact that there is a direct relationship between productivity and human resources (Tabassi and Bakar, 2009).

The Cambridge International and Oxford Advance Learner's dictionaries define productivity in general as "the rate at which good s are produced with reference to number of people and amount of materials necessary to produced it". On the other hand, productivity is generally defined as the output to input ratio which means effective utilization of resources (inputs) in producing goods and/or services (output) (Sumanth, 1984) but it can be defined in many ways. In construction sector, it's usually called labour productivity which known as work units created per man-hour (Attar et al., 2012). The mathematical statement of productivity clearly shows that productivity improves when output rises while input falls or when input falls while output rises (Osabiya, 2015). Productivity increases can be reached if proper labour management, faster set-up of machine and tools, maintain the project quality, proper material handling are met.

2.2 Construction Labour Force in Sri Lanka

Sri Lanka as a developing country, is constantly exposed to new problems and challenges as the earth's resources diminish as a result of population growth and economic expansion (Jayalath and Gunawardhana, 2017). After the end of civil war in 2009, there was a boom in construction which was significantly contributing to the GDP growth of the country and most of projects were through the public sector infrastructure investment (Soyza,2022).

2.3 Motivation Concept and Its History

"The term motivation refers to the psychological process that gives behavior purpose and direction" (Eltom M.A.D, 2007). "Motivation is the study of why people think and behave as they do" (Graham and Weiner, 2013). The concept of motivation, as well as a use of the Hawthorne tests is done in the United States about a century ago. The primary concept of motivation is to induce employee or employees towards a task. Different thing motivates different people, and the employee's age and

generation might have an impact on motivation. It's fascinating to examine the varying needs of employees from different generations (Mariusz-jan radlo,2022).

Maslow's Hierarchy of needs is one of the most widely discussed motivation theories. Maslow attempted to view the human needs as a hierarchy, rising from the lowest to the highest, and concluded that as one set of wants is met, another set of wants is realized, this type of need no longer serves as a motivation. Maslow's hierarchy of needs has been categorized for five parts which known as safety, physiological, belongingness and love (social), esteem, and self-actualization (Bob, 2009). There are some other theories also. Equity theory is one of the most important concepts in financial compensation (Pritchard, 1969). According to Equity Theory of Adams, a fair balance should be achieved between an employee's inputs (hard effort, skill level) and an employee's outputs (salary, benefits, etc.). The Adams' equity theory concept is represented as below.

$$\frac{Out\ comes\ by\ a\ person}{Inputs\ by\ a\ person} = \frac{Out\ comes\ by\ another\ person}{Input\ by\ another\ person}$$

Motivating is the capacity to program individuals with a common goal and to sustain a continuous, harmonious relationship among all persons (Widanagamachchi, 2013). For humans, the terms intrinsic or extrinsic motivation are commonly used. It can also be used to describe the causes of animal behavior in theory, but this article focuses solely on human behavior. Motivation can be rooted in a basic need or, in some cases, specific needs such as eating and resting, a goal, or an ideal, according to various theories. Motivation is not the same as volition or optimism. Employees in any organization require something to motivate them. (Attar et al., 2012; Widanagamachchi, 2013; Chigara and Moyo, 2014).

Positive motivation for employees would result in better organizational outcomes. By permitting the measurement of actual performance against the operations-based targets, the formulation of operations-based targets will aid in the providing of strategic feedback.(Malina and Selto, 2001).

The concept of building productivity emerged in the early twentieth century to improve bricklaying operations at that time (Halwatura, 2015). However, it remains a concern in the construction business, and if productivity is there, it saves time and money due to resource efficiency (Graham and Weiner, 2013). Employees are used as resources by organizations to justify power and show the organization as caring for employees and their ethical treatment, while also controlling employees and assuring their productivity. There are several factors influence for the labor productivity and the most important factor is fundamental education for any effective labor force. The food as well transportation and sanitation may as well have an impact towards the productivity (Heizer and Render, 1999).

2.4 Factors Affecting Labour Productivity (Motivational Factors)

Halwatura, (2015) identified lot of factors affecting labor productivity and he listed out 10 critical factors for the motivation in his research. For that he has considered Important index (II) and shown the important of using these methods to motivate the labours. They were listed in the order of importance of overtime, on-time payment, Medical care, social activity opportunities, working in social insurance, job security, opportunity to undertake challenging task, accommodation, bonus at the end of project or year, love and belongingness. Not only Halwatura but also Widanagamachchi, (2013) listed out some other factors which helps to motivate the labours. Employee rewards for job performance, having good two-way communication, treating employees with respect, employing effective discipline and penalty, having high expectations, training, understanding employee behavior, and effective leadership are examples of these. There are some other researchers re-confirmed time to time that the above factors helps to motivate the construction labours (Tabassi and Bakar, 2009; Fagbenle, 2011; Chigara and Moyo, 2014; Ghoddousi et al., 2015). Furthermore, some other factors have been identified by other researchers in their research study. Those are technology, managerial style, allowances / relief, respect for the employee, relations with workmates, teamwork & communication, availability of machines and equipment, (Khan, 2012). Many factors identified through the literature but settled toSixteen (16) motivational strategies after combining the similar strategies.

A literature survey on productivity and factors affecting on labour productivity (motivational factors) in Sri Lanka and also other various countries were illustrated in this chapter. The literature review further aimed at an overview of the construction industry and Sri Lankan context. Finally, the

benefits of using labour motivational factors and strategies has been discussed. According to the motivational theories Maslow's Hierarchy of Need Theory, Equity Theory It was discovered that the level of motivation of construction workers is important in order to increase productivity in the construction business.

Moreover, bulk of labour motivational factors and strategies were filtered out into 16. Those are overtime Payments, on-time payment, medical care, working in social insurance, job security, opportunity to undertake challenging task, free or concessionary accommodation, bonus at the end of project or year, love and belongingness, having good two-way communication, performance-based rewards, disciplinary actions and punishment, give high expectations and respect the employees, training, technology and availability of machines and equipment.

3   METHODOLOGY

Any research requires related data, which can be qualitative or quantitative. In this study, a list of labour motivational factors were identified from the previous literature and internet search. Pass researches have done these finding factors from the expert interview. These findings were further enhanced through an expert interview.

Table 1 : Information of the Interviewees

Participants	Experiences (Yrs)
Engineer	15
Civil Engineer	5
Project Manager	15
Charted Quantity Surveyor	10
Charted Quantity Surveyor	15

In conducting this research whenever there is no adequate existing published data expert interviews were conducted to collect the Industry knowledge. Those experts were the   constriction professionals as shows in the table 1. Confined findings were included in a questionnaire survey to validate and rank the findings. In this study, the "mixed method" has been used to gain a clear understanding of this study and finalize with less errors. The mixed method studies, allowing for more clear and complete ideas to be encountered with both studies together than with isolated studies of quantitative or qualitative methods. Combining approaches allows for more details in the conclusion and different techniques for data collection and analysis on the same study may improve the validity of the final output. Non-probability sampling was used. Because of the random selection of experts, simple random sampling was used, and it should reflect the true population of Sri Lanka. So, a few people were chosen at random from the population. The population in this study consisted of construction industry professionals. The interview data was analyzed to develop a questionnaire survey and the data collected from the questionnaire survey was analyzed using the Relative Important Index (RII) to determine the significant of each factor in Sri Lanka's construction industry. The questionnaire survey attracted 39 responses from the industry professionals.

Furthermore, the use of labor motivation factors was analyzed using the RII method to gain a general understanding of common usage. CHI SQUARE test also used to check the association of time saving, cost saving and quality improvement between labour motivation factors.

4   DATA ANALYSIS AND DISCUSSION

Five expert interviews were conducted in order to build upon and validate the factors identified through the literature survey and to short list the content for questionnaire survey. That was the prime purpose of the expert interviews. One of the labor motivational factor was rejected based on expert interviews, and a total of 23 labor motivational factors and strategies were finalized. Those were carried out for the questionnaire survey used to collect data for this study.

The findings of this study are based on the Relative Important Index (RII) analysis and Chi-Square Test of quantitative survey responses. In the first section of the questionnaire, demographical data of the respondents were collected. In order to success that, the profession, experience of working, expertise area in his/her organization were given attention majorly. Mostly, engineers, quantity surveyors, project managers and architect from the experience groups between 0-20 have responded to the questionnaire. Rather than that, there were 2% of responses received from the category of more than 20 years. Out of the 39 responders, 15 of them are engineers whereas 13 are QS, 4 responds were coming from PM and Architect was 7. Most of the responders are from the experience groups of 0-5 and 5-10. 6 responders are from 10-15,3 from 15-20 experience categories.

Table 2 presents the RII analysis of the motivational factors to determine the most significant factors.

Table 2 : RII Analysis to Determine Most Significant Factors

	5	4	3	2	1	RII	M	Rank
Training	22	17	0	0	0	0.91	0.11	1
On-time payment	17	19	3	0	0	0.87	0.07	2
Technology	18	18	2	1	0	0.87	0.07	2
Overtime Payments	14	24	0	0	1	0.86	0.05	4
Bonus at the end of project or year	14	23	1	1	0	0.86	0.05	4
Availability of machines and equipment	15	19	3	2	0	0.84	0.04	6
Prepare a safety environment	13	21	5	0	0	0.84	0.04	6
Improve the skill levels of labours	13	21	4	1	0	0.84	0.03	8
Give high expectations and respect the employees	14	18	6	1	0	0.83	0.03	8
Medical care	10	24	5	0	0	0.83	0.02	10
Having good two-way communication	11	23	4	1	0	0.83	0.02	10
Group target-based working	9	27	+	0	1	0.82	0.02	10
Performance based rewards	9	27	1	1	1	0.82	0.01	13
Provide better PPE facilities	7	27	3	2	0	0.80	0.00	14
Job security	8	23	6	2	0	0.79	-0.01	15
Free or concessionary accommodation	9	15	15	0	0	0.77	-0.03	16
Isolation some labours and measure them performance individually (who are not performing well)	10	18	8	1	2	0.77	-0.03	16
Provide Foods & Transport	8	17	13	1	0	0.76	-0.04	18
Move the group of people for other projects of the organization with shuffling time to time	5	25	6	2	1	0.76	-0.04	18
Disciplinary actions and punishment	11	12	12	3	1	0.75	-0.05	20
Opportunity to undertake challenging task	5	22	9	2	1	0.74	-0.06	21
Love and belongingness	5	18	15	0	1	0.73	-0.07	22
Open opportunity for some entertainment programs & creativeness	8	13	7	1	0	0.59	-0.21	23

Using all the responses from the questionnaire, Relative Important Index (RII) was applied for all 23 factors and ranked to identified most significant factors and the strategies. 'M' is a Variance in the above table, and weighted values are given. In order of 5 to 1, strongly agree, agree, undecided, disagree, strongly disagree. Mean of RII was calculated to establish variance for those RII values. Thereafter, considering the mean value, the values below the mean were rejected. The most significant factors that will motivate construction labours are those with equivalent or higher values. (0.80 is the relative mean value). There were 14 most significant motivational factors and strategies identified, with training being

the most significant with a value of 91%, followed by time payments at 87%, and technology at 87%. The next highest value is 86% for overtime payments and bonuses at the end of the project year. the most significant 14 number of factors and strategies were only retained for further data analysis in this research study.

Further, there were identified various cost centers in implementing the labour motivation factors. The cost centers were financial, time, environment. Financial includes the cost of labours, machineries and overhead cost. In this questionnaire survey, it shows there are many costs in below factors when consider time and financial in accordance with the respondent's interpretations and those are listed here, from high to low. Training, overtime payments, technology, Improve the skill levels of labours, on time payments.

Following that, the cost-savings ratio was considered, but the environment cost was rejected due to the smaller number of responses obtained from the questionnaire. That means, less important to influence motivational factors.

Table 3 : Cost & Time Effectiveness

	Financial cost	Time cost	P	Q
Training	23	23	1.29	1.39
On-time payment	26	12	0.99	2.39
Technology	30	12	1.03	2.72
Overtime Payments	28	15	1.05	1.93
Bonus at the end of project or year	26	11	1.08	2.33
Availability of machines and equipment	25	12	1.17	2.56
Prepare a safety environment	9	14	3.00	1.86
Improve the skill levels of labours	18	22	1.57	1.36
Give high expectations and respect the employees	6	14	3.94	1.88
Medical care	16	9	1.44	2.59
Having good two-way communication	2	15	12.50	2.02
Group target-based working	9	21	3.37	1.46
Performance based rewards	23	11	1.25	2.58
Provide better PPE facilities	20	10	1.30	2.53

$$P = \frac{Cost\ Saving(Financial)}{Financial\ Cost} \qquad Q = \frac{Time\ Saving}{Time\ Cost}$$

As per the above table, all are positive values (P and Q). Considering those we can say that there is a positive impact on the labour motivational factors and strategies. Further, it's like cost and time saving when implement of those strategies but there is no actual way to show that due to those are not quantifiable data but just based on respondent's opinions. Fortunately, there is some positive effectiveness to over the cost saving with financial cost and over the time saving with time cost.

Having good two-way communication is the highest cost-effective factor according to this table and the lowest factor is On-time payment which takes 0.99. In relation to the time effectiveness, the highest factor is using technology and the lowest one is Improve the skill levels of labours. According to these findings we will be able to take decision which factor or factors are most suitable for our project type and what should use or shouldn't be used. Top 10 cost effective factors are having good two-way communication, give high expectations and respect the employees, group target-based working, prepare a safety environment, improve the skill levels of labours, medical care, provide better PPE facilities, training, performance-based rewards, availability of machines and equipment. Top 10 no of time effective factors are technology, medical care, performance-based rewards, availability of machines and equipment, provide better PPE facilities, on-time payment, bonus at the end of project or year, having good two-way communication, overtime Payments, give high expectations and respect the employees. Furthermore, the framework has been developed based on these top 10.

Since cost savings, time savings, and quality improvements have been identified as the most critical factors influencing construction project performance. The Chi-Square test was used to examine the association between time saving, cost saving, and quality improvement between labour motivational factors. Following the hypothesis testing from the test of association using the Chi-Square distribution for the labour motivation factors and cost savings.

	Cost Saving			
	High	Moderate	Less	Row Total
Training	19	14	4	37
On-time payment	9	21	8	38
Technology	22	12	3	37
Overtime Payments	16	18	4	38
Bonus at the end of project or year	14	18	6	38
Availability of machines and equipment	15	20	3	38
Prepare a safety environment	13	18	6	37
Improve the skill levels of labours	13	21	4	38
Give high expectations and respect the employees	9	18	8	35
Medical care	6	21	9	36
Having good two-way communication	12	15	9	36
Group target-based working	17	18	4	39
Performance based rewards	16	17	4	37
Provide better PPE facilities	6	27	6	39
Column Total	187	258	78	523

Figure 1 : Summary of Observed Frequencies

	Cost Saving			
	High	Moderate	Less	Row Total
Training	13.23	18.25	5.52	37
On-time payment	13.59	18.75	5.67	38
Technology	13.23	18.25	5.52	37
Overtime Payments	13.59	18.75	5.67	38
Bonus at the end of project or year	13.59	18.75	5.67	38
Availability of machines and equipment	13.59	18.75	5.67	38
Prepare a safety environment	13.23	18.25	5.52	37
Improve the skill levels of labours	13.59	18.75	5.67	38
Give high expectations and respect the employees	12.51	17.27	5.22	35
Medical care	12.87	17.76	5.37	36
Having good two-way communication	12.87	17.76	5.37	36
Group target-based working	13.94	19.24	5.82	39
Performance based rewards	13.23	18.25	5.52	37
Provide better PPE facilities	13.94	19.24	5.82	39
Column total	187	258	78	523

Figure 2 : Summary of Expected Frequencies

Defined hypothesis,

Ho – No association between labour motivation factors and project performance in terms of cost saving.
H1 – There is an association between labour motivation factors and project performance in terms of cost saving.

    Degrees of freedom: (No of columns – 1) (No of rows – 1)
    According to this,
    Degrees of freedom = (3 - 1) (14 – 1) = 26

It falls within the rejection region because the calculated Chi-Square value of 41.36 is greater than the critical Chi-Square value at 5% significance level on 26 degrees of freedom. As a result, there is enough evidence to suggest that there is a link between labor motivation and cost savings. The results of the chi square test of the association method show that Ho (No association between labor motivational factors and cost savings) can be rejected because the calculated value is greater than the critical value at the significant level.

Accordingly, there is an association between labor motivation factors and project performance due to cost savings. The test result was taken from this as listed below.

Table 4 : Chi-square Test Result

Elements	Test Result
Labour motivation factors and cost savings	Pass
Labour motivation factors and the time savings	Pass
Labour motivation factors and the quality improvement	Pass

According to the above findings, there is an association between labor motivation factors with cost savings, time saving and quality improvements.

To determine the use of motivation factors in Sri Lanka, the RII method was used in the same way as the initial RII analysis. According to this analysis, it observes that some significant factors are not commonly used in the industry in Sri Lanka. For example, some of high significant factors such as bonus at the end of project year, medical care, provide better PPE facilities are not use significantly in the industry. Moreover, those factors are found to be more time and cost effective according to this study. Therefor due consideration shall be given to those motivational strategies in improving the project performance.

On the other hand, it shows that some general uses are not the most significant factors such as medical care. The most frequently used motivational strategies seems to be different from those are highly significant and cost effective.

Figure 3 shows the details of project performance factors and it helps to improve the project efficiency for the contractors who have implement those.
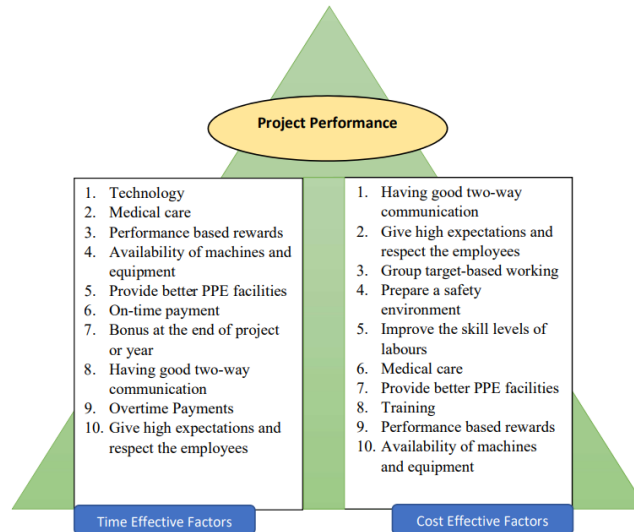

Figure 3 : Labour motivation framework

5   CONCLUSION & RECOMMENDATIONS

This study focusses to identify and evaluate different labour motivational factors in improving the building construction project performances in Sri Lanka, accomplished by achieving four specific objectives. Data was collected and analyzed using the mixed method. In the first, there were listed out 23 labour motivational factors such as overtime payments, medical care, training according to deep literature review and expert interviews. The second objective was to determine the cost of deployed different motivational factors. According to that, the cost of each and every factor were determined and listed the top 10 cost and time effective factors. To fulfil the third objective, the Chi-squared method used to determine the association between cost those factors in order to cost saving, time saving and

quality improvements and the result was positive for all. Finally, developed a framework on utilizing the above identified factors to optimize the building project performance.

This section concludes with recommendations for mitigating measures to be implemented in order to adapt to construction projects, with due consideration of both positive and negative impacts in implementing labour motivation factors. According to the findings, this research recommends: to use high cost effective and time effective factors. According to the framework we suggest to use such as technology, medical care, performance-based rewards, availability of machines & equipment and provide better PPE facilities as the major time effective factors. In other hand, there can be used such as having good two way communication, give high expectation & respect the employees, group target-based working, prepare a safety environment, improve the skill level of labours for the cost-effective factors. Finally, there are overall effective factors have been identified with reference with the frame work. Those are having good two-way communication and training.

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