

Labour-related factors affecting construction productivity in Sri Lankan building projects: perspectives of engineers and managers

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Abstract

Purpose – Past studies highlight a wide range of labour-related problems resulting in productivity loss in the construction industry of many developing countries. This study aims to quantify the impacts of labour-related factors on the productivity of construction operations in Sri Lankan building projects based on the viewpoint of engineers and construction managers for upgrading management/organisational policies and practices.

Design/methodology/approach – Qualitative and quantitative approaches were used to identify the critical factors. Further, a series of industry consultative discussions were conducted through problem-based communication approaches to analyse the actions required.

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The authors wish to acknowledge the construction professionals who actively participated in the questionnaire survey and discussion sessions in this study. In addition, the Tertiary and Vocational Education Commission of Sri Lanka, Construction Industry Development Authority, University of Peradeniya and Wayamba University of Sri Lanka are also acknowledged for providing valuable support to this study.

Disclosure statement: No potential conflict of interest was reported by the authors.

Data availability statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.



Findings – A total of 21 factors were determined as critical, where skills shortage, labourers' thinking abilities, work experience, knowledge in construction works and discipline were leading in the list. The statistical tests and the experts' discussion outcomes ensured the validity and reliability of the study findings.

Research limitations/implications – The study outcomes will contribute to finding out better ways for directing labour in the industry practices and revising organisational policies towards achieving higher productivity levels in construction operations. Though the study findings are limited to the Sri Lankan context, some findings may be tested in other developing countries in similar scenarios.

Originality/value – The study findings show why the identified factors are critical, how those influence construction practices and what actions need to be considered for addressing the industry's productivity-related challenges. These can play a key role in upgrading the construction management practices and organisational policies to the near-future stages.

Keywords Built environment, Construction labour, Productivity improvement, Skills shortage

Paper type Research paper

1. Introduction and literature review

The construction industry plays a significant role in infrastructure development and its facilities in a country, and it makes a major contribution to the development of the national economy in a country (Halwatura, 2015). The construction sector accounts for a considerable proportion of gross domestic product (GDP) in different countries – for instance, 9% in Oman, 6.1% in the UK and 5.5% in Japan (Umar, 2021). When it comes to Sri Lanka, the consultations with the Construction Industry Development Authority (CIDA) highlight that 6% of GDP is accounted to the construction sector. Umar (2021) further state that the rapid growth of the construction industry in many developing countries like Sri Lanka has created a large number of jobs for different labour categories, which is expected to be further rising up for the next some years.

Labour is the most valuable asset in the construction industry since it combines all other resources in various construction tasks (Ghate and Minde, 2016). The labour costs contribute in a range of 30–50% of total project costs in a typical construction project (Shahab and Audrius, 2018). Hence, the productivity improvement in labour operations is crucial to construction firms for their successful long run in the industry (Ghate and Minde, 2016). In many developing countries, the construction industry has been experiencing productivity loss which affects the physical progress of construction projects (Ghoddousi *et al.*, 2015; Nourhane *et al.*, 2018; Silva *et al.*, 2018). Many studies report that a wide range of labour-related problems are the major components that lead to productivity loss in construction operations (Soham and Rajiv, 2013; Onyekachi, 2018; Dinh and Nguyen, 2019; Murari and Joshi, 2019). Notably, poor labour productivity was identified as one of the significant factors that caused construction delays in Oman (Umar, 2018).

Labour skill shortages have been the problems for the construction firms that significantly affect the performance of labour leading to a low productivity level of construction operations (Chigara and Moyo, 2014; Shashank *et al.*, 2014; Ghoddousi *et al.*, 2015; Ghate and Minde, 2016; Nourhane *et al.*, 2018; Onyekachi, 2018). Studies reveal that the lack of work experience of labourers has been one of the major reasons for the labour skill shortages in the construction industry (Robles *et al.*, 2014; Dharani, 2015; Nourhane *et al.*, 2018; Silva *et al.*, 2018; Dinh and Nguyen, 2019; Murari and Joshi, 2019). Along with the lack of work experience, it has also been found that labourers' poor education background and poor training facilities significantly influence the labour skills (Windapo, 2016; Orlando and Isabirye, 2018; Silva *et al.*, 2018; Mistri *et al.*, 2019). Due to the skill shortages, unskilled labourers work as skilled labourers in construction projects in many countries (Saurav *et al.*, 2017; Onyekachi, 2018; Shahab and Audrius, 2018), including Sri Lanka (Fernando *et al.*, 2016; Silva *et al.*, 2018).

Studies reveal that the physical abilities of labourers affected the productivity of construction operations in many construction projects in India (Soham and Rajiv, 2013; Shashank *et al.*, 2014; Dharani, 2015), Indonesia (Soekiman *et al.*, 2011), Iran (Shahab and

Audrius, 2018) and Vietnam (Dinh and Nguyen, 2019). The ageing workforce is highlighted as the major reason for the problems related to the physical abilities of labourers (Kaya *et al.*, 2014; Shashank *et al.*, 2014; Windapo, 2016; Onyekachi, 2018; Mistri *et al.*, 2019). Studies affirm that the physical abilities of labourers are also affected due to the excessive workload of labourers (Hughes and Thorpe, 2014; Mistri *et al.*, 2019).

Umar *et al.* (2018a) have assessed the health profile and body pain of 30 construction workers from Gulf Cooperation Council (GCC) countries and revealed that the majority of them were having the problems related to excessive body weight, whereas the blood pressure of 43.3% of them was more than the threshold and fall under the hypertension values. Notably, it was identified that more than 45% of them had been experiencing body pain, especially in their neck, shoulder, lower back, leg and knees for some months. Umar *et al.* (2018a) have identified that sleeping hours have a major influence on the pain experience of workers.

The health problems and the use of alcohol/drugs amongst labourers have been identified as the significant factors affecting labour productivity in the Indian construction industry (Mistri *et al.*, 2019). The excessive use of alcohol/drugs was also identified that significantly affected the performance of labourers in many construction projects in Indonesia (Soekiman *et al.*, 2011). The health problems have a significant impact on the labourers' ability to adapt to the changes in the working environment (Robles *et al.*, 2014). Studies identified that the psychological and economic problems of labourers influenced their performance in construction activities in India (Dharani, 2015) and Turkey (Kazaz *et al.*, 2016). Shashank *et al.* (2014) stated that the personal problems of labourers also had a significant impact on the labour performance in many construction sites in India.

Having a good understanding amongst workers reduces labour injuries and builds project safety and quality (Kesavan *et al.*, 2014). Notably, International Labour Organization (2015) indicates the deaths of more than a 100,000 construction workers every year due to different occupational safety and health conditions, whereas this is nearly 30% of all occupational deadly injuries. Considering the construction sector of Oman, Umar *et al.* (2018b) report that the major portion of work-related injuries has arisen from road traffic accidents followed by slipping and falling of workers and then getting crammed between solid objects. Umar and Egbu (2017) reveal that a significant proportion of accidents arising from the workers' faults compared with the factors related to equipment, materials, environment and management.

It has been found that labour discipline needs to be improved in the construction industry in many countries (Dharani, 2015; Orlando and Isabirye, 2018; Dinh and Nguyen, 2019). Lack of labour morale/commitment was identified in Indian (Saurav *et al.*, 2017) and Nigerian (Onyekachi, 2018) construction sectors. Hickson and Ellis (2013) revealed that the late arrival, early quit and frequent unscheduled breaks significantly affected the productivity of labour operations in many construction projects in Trinidad and Tobago. Studies reported that the Egyptian labourers spend much time for unnecessary talks, eating and drinking, and this significantly influenced the productivity of labour operations in construction (Shehata and El-Gohary, 2011; Nourhane *et al.*, 2018).

Overall, the current study has reviewed the past studies that focussed on the labour-related problems affecting the productivity of construction operations in different contexts in the last decade (from 2010 to 2020). The potential research articles were selected by examining the titles, abstracts and keywords (related to the terms "construction", "labour", "performance" and "productivity") in popular online search engines "Google Scholar, ResearchGate and Scopus" and library facilities. The titles and keywords of the articles were carefully studied. The recommendations from subject matter experts were also considered in the selection of research articles. The information was extracted from the selected articles considering the needs and current practices in developing countries like Sri Lanka. Table 1 illustrates the mapping of the identified significant labour-related factors affecting construction productivity with the recent studies from different contexts of some developing countries.

Code	Factors	Past studies from different countries												
		Egypt	India	Indonesia	Iran	Nigeria	Palestine	South Africa	Sri Lanka	Trinidad and Tobago	Turkey	Turkmenistan	Vietnam	Zimbabwe
L1	Lack of working experience	X	X	X	X	X	X	X	X	X	X	X	X	X
L2	Poor education background	X	X	X	X	X	X	X	X	X	X	X	X	X
L3	Lack of knowledge in construction works	X	X	X	X	X	X	X	X	X	X	X	X	X
L4	Poor ability of reading, understanding, speaking and writing	X	X	X	X	X	X	X	X	X	X	X	X	X
L5	Lack of thinking abilities	X	X	X	X	X	X	X	X	X	X	X	X	X
L6	Physical ability and fatigue	X	X	X	X	X	X	X	X	X	X	X	X	X
L7	Health problems	X	X	X	X	X	X	X	X	X	X	X	X	X
L8	Use of alcohol and drugs	X	X	X	X	X	X	X	X	X	X	X	X	X
L9	Lack of labour morale/commitment	X	X	X	X	X	X	X	X	X	X	X	X	X
L10	Labour discipline	X	X	X	X	X	X	X	X	X	X	X	X	X
L11	Ageng workforce	X	X	X	X	X	X	X	X	X	X	X	X	X
L12	Psychological problems	X	X	X	X	X	X	X	X	X	X	X	X	X
L13	Economic problems	X	X	X	X	X	X	X	X	X	X	X	X	X
L14	Personal problems	X	X	X	X	X	X	X	X	X	X	X	X	X
L15	Communication problems	X	X	X	X	X	X	X	X	X	X	X	X	X
L16	Misunderstanding with other workers	X	X	X	X	X	X	X	X	X	X	X	X	X
L17	Skill shortage	X	X	X	X	X	X	X	X	X	X	X	X	X
L18	Mixture of three levels (skilled, semi-skilled and unskilled)	X	X	X	X	X	X	X	X	X	X	X	X	X
L19	Late arrival, early quit and frequent unscheduled breaks	X	X	X	X	X	X	X	X	X	X	X	X	X
L20	Unnecessary talks	X	X	X	X	X	X	X	X	X	X	X	X	X
L21	Work overload	X	X	X	X	X	X	X	X	X	X	X	X	X
L22	Work dissatisfaction	X	X	X	X	X	X	X	X	X	X	X	X	X
L23	Inability to understand drawings	X	X	X	X	X	X	X	X	X	X	X	X	X
L24	Inability to adapt to changes in new environments	X	X	X	X	X	X	X	X	X	X	X	X	X
L25	Improper material handling	X	X	X	X	X	X	X	X	X	X	X	X	X
L26	Poor equipment/tool handling	X	X	X	X	X	X	X	X	X	X	X	X	X
L27	Changing nature of career expectation	X	X	X	X	X	X	X	X	X	X	X	X	X
L28	Skill dram/emigration	X	X	X	X	X	X	X	X	X	X	X	X	X
L29	Less job interest due to family and society	X	X	X	X	X	X	X	X	X	X	X	X	X
L30	Other ways of earning money	X	X	X	X	X	X	X	X	X	X	X	X	X
L31	Labour absenteeism	X	X	X	X	X	X	X	X	X	X	X	X	X
L32	Labour strikes	X	X	X	X	X	X	X	X	X	X	X	X	X

Source(s): Egypt (Shehata and El-Gohary, 2011; Nourhane *et al.*, 2018), India (Dharani, 2015; Ghate and Minde, 2016; Saurav *et al.*, 2017; Mishri *et al.*, 2019; Murari and Joshi, 2019; Agrawal and Halder, 2020), Indonesia (Soekiman *et al.*, 2011; Adi and Nam, 2012), Iran (Ghoddousi *et al.*, 2015; Shahab and Andrus, 2018), Nigeria (Zannah *et al.*, 2017; Onyekachi, 2018), Palestine (Mahamad, 2013), South Africa (Windapo, 2016; Oke *et al.*, 2018; Orando and Ishirye, 2018), Sri Lanka (Widagamechchi, 2013; Halawatura, 2015; Kesavan *et al.*, 2015; Fernando *et al.*, 2016; TVPC, 2017; Silva *et al.*, 2018; Manoharan *et al.*, 2020), Trinidad and Tobago (Hickson and Ellis, 2013), Turkey (Kaya *et al.*, 2014; Kazaz *et al.*, 2016), Turkmenistan (Durdyev *et al.*, 2013), Vietnam (Dinh and Nguyen, 2019) and Zimbabwe (Chigara and Moyo, 2014)

Table 1.
Labour-related factors
affecting construction
productivity - mapping
with other past studies
from different contexts
of some developing
countries

1.1 Sri Lankan context

In the Sri Lankan construction industry, a few studies have investigated the labour-related factors affecting construction productivity. [Widanagamachchi \(2013\)](#) revealed that difficulties in understanding technical drawings, the temporary nature of the job, hardworking environment and lack of social recognition were the major reasons for the lack of motivation amongst the Sri Lankan labourers in construction projects. The labourers' inability in understanding drawings was also highlighted by [Praveen *et al.* \(2011\)](#), along with their improper material handling skills as the problems for the Sri Lankan construction contractors. [Kesavan *et al.* \(2015\)](#) highlighted that the shortage of labourers, personal conflicts amongst labourers, low motivation and morale of labourers, slow mobilisation of labourers, unqualified/inadequate experience of labourers and labourer injuries were the major labour-related issues in the Sri Lankan construction projects. Poor cognitive and job-specific technical skills of the Sri Lankan labourers have been highlighted by the Construction Industry Sector Council of Sri Lanka as serious problems against improving labour productivity in the Sri Lankan construction industry ([TVEC, 2017](#)). Though the industry feels that the physical progress of construction operations is significantly affected due to the above-discussed labour-related problems, most organisations do not take the necessary steps to address those problems appropriately in the Sri Lankan construction industry ([Fernando *et al.*, 2016](#)). Furthermore, a series of interviews conducted by [Manoharan *et al.* \(2020\)](#) amongst 50 Sri Lankan construction experts working in different job categories have revealed that most construction organisations do not adequately address labour-related issues in the Sri Lankan construction industry.

1.2 Importance of this study

Overall, studies highlight the essential need for the construction industry in many developing countries to address a wide range of labour-related problems towards improving the productivity of construction operations. Considering the Sri Lankan construction sector, the consultations with the CIDA reveal that many construction firms have higher investments for the construction of buildings than other types. According to Human Capital Index (2019), hundreds of thousands of labourers are working in building construction projects in Sri Lanka ([Central Bank of Sri Lanka, 2019](#)). The engineers and construction managers are the experts who can play a central role in decision-making processes at the organisational level. Considering these aspects, this study intends to quantify the impact levels of labour-related factors on the productivity of construction operations in the Sri Lankan building construction projects in the current scenario based on the perspectives of engineers and construction managers. This will be beneficial to the construction industry in many developing countries for upgrading their organisational policies and management practices against labour-related problems.

2. Methodology

The study methodology included both qualitative and quantitative approaches to determine the significant labour-related factors affecting the productivity of building construction operations based on the perspectives of engineers and construction managers. The study also included comprehensive approaches to test the validity and reliability of the findings. The following sections describe those.

2.1 Qualitative analysis

The thematic analysis method was applied to the data collected from the literature review to qualitatively identify the significant labour-related factors influencing construction productivity. Thematic analysis is a recognised approach that can be used to investigate the views, opinions, knowledge, experiences or values of respondents from a set of qualitative

data (Caulfield, 2019). The common themes, topics, ideas and patterns that come up repeatedly were examined in the collected data using this method.

2.2 Questionnaire survey

A questionnaire survey was carried out amongst 90 Sri Lankan construction firms where an engineer or construction manager represented each respective firm to respond to the survey questions based on their current practices in building construction projects. The design of the questionnaire consisted of two sections (Section A and Section B), where Section A covered the respondents' background and Section B included the labour-related factors shown in Table 1. The survey respondents were instructed to indicate the impact levels of each factor on construction productivity based on a Likert scale of five ordinal measures from 1 to 5 (very low effect to very high effect). The designed questionnaires were validated through cognitive interviews conducted amongst some engineers/managers.

Only the upper graded contractors registered in the CIDA of Sri Lanka were considered for this survey since most of the major projects are executed by such contractors in the country. In Sri Lanka, CIDA is the recognised body that provides the contractors' registration with suitable grades for the construction field. According to the National Registration and Grading Scheme for Construction Contractors of CIDA, the construction contractors are categorised into 11 grades based on their financial capacity, technical ability and the experience gained in the field. Here, the upper graded contractors are the construction firms who have a minimum C4 grade of CIDA registration, and the minimum financial limit to obtain this grade is 50m Sri Lankan Rupees. When the survey began, a total of 450 construction contractors had the CIDA registration with the grade C4 or above. Here, the list included the contractors who are involved in road/highway projects, bridge projects, water supply and sewerage works, irrigation and drainage works, dredging and reclamation too. Considering the difficulties in deciding the actual sample size of contractors who are involved in building construction projects, as recommended by Showkat and Parveen (2017), the snowball sampling method was used to find the building contractors for this questionnaire survey. The snowball sampling method is an approach of expanding the sample size through a small population of known individual survey participants from the initial stage of the survey.

Figure 1 shows the detailed profile of survey respondents based on their CIDA grades and work experience in the building construction field. The highest percentage of contractors was in the C4 grade. Referring to their work experience in the construction field, the majority was in the range of 5–10 years, whereas 98% had more than 5 years of work experience, as well as 58%, 35% and 23% had a minimum of 10, 15 and 20 years of work experience, respectively.

2.3 Quantitative analysis

The quantitative approaches are more scientific and make the data in a numeric form which is easier to interpret (Dinh and Nguyen, 2019). The Relative Importance Index (RII) method was applied to measure the impact levels of the factors on the productivity of construction operations. As recommended by past studies (Shahab and Audrius, 2018; Dinh and Nguyen, 2019), Equation (1) was used to calculate RII values.

$$RII = \frac{\sum W}{A * N} \quad (1)$$

- (1) W represents the weight assigned to each factor by response ranges (1 – very low, 2 – low, 3 – moderate, 4 – high and 5 – very high);
- (2) A represents the maximum weight given (A equals 5) and
- (3) N represents the total number of responses.

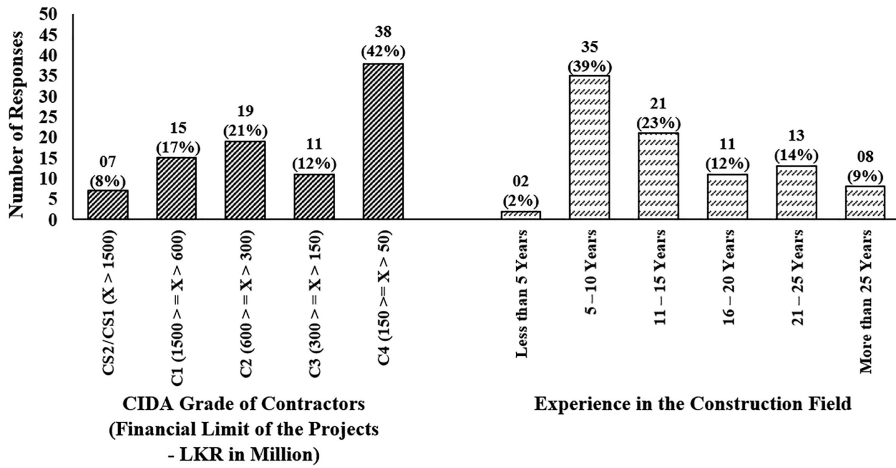


Figure 1.
Detailed profile of survey respondents

The higher RII value illustrates that the corresponding factor has a high impact on the productivity of construction operations. As per the recommendations of previous studies (Shanmuganathan *et al.*, 2014; Manoharan *et al.*, 2020), the minimum RII value to decide the corresponding factor as critical was 0.7. To test the reliability and validity of the results, the Coefficient of Variation (CV) values were calculated for each factor. The CV value is defined as the ratio between standard deviation and RII values (Solly and Gezani, 2017). According to Statistics Canada (2020), a CV value of less than 0.3 ensures the reliability of the result for each factor.

2.4 Industry consultative meetings and workshops

A series of meetings and industry consultative workshops were conducted amongst construction experts from various working categories, and the results were discussed to determine suitable mitigation measures that need to be taken in the organisational/management practices. The problem-based communication approaches were mainly used in the discussion sessions, and the results were validated through these discussion outcomes. The problem-based communication approaches are very useful for understanding the issues, exchanging information, generating ideas and finding solutions (Manoharan *et al.*, 2021a).

3. Results and discussion

Based on the perspectives of engineers and construction managers, the impact levels of labour-related factors on the productivity of construction operations are shown in Table 2. Amongst those 32 factors, 21 factors were determined as critical based on their RII values (more than 0.7). Skills shortage, lack of thinking abilities, lack of working experience, lack of knowledge in construction works and poor discipline were found in the top five ranking list. This section discusses those leading factors compared with the previous findings in Sri Lanka and other foreign contexts, also describing the reasons for the current status of those factors, how those are linked with other factors and the required actions in the industry activities.

3.1 Lack of skills and work experience amongst labourers

The study reports that the skills shortage and lack of work experience of labourers significantly affect the performance, productivity and quality of work operations in building construction projects in Sri Lanka. The skills shortage and lack of work experience of labourers have also

Codes of factors	Mean	RII	SD	CV	Ranking	Level of impact
L17	4.08	0.82	0.15	0.18	1	High
L5	4.03	0.81	0.14	0.17	2	High
L1	4.02	0.80	0.16	0.20	3	High
L3	3.97	0.79	0.16	0.20	4	High
L10	3.94	0.79	0.17	0.22	5	High
L9	3.92	0.78	0.16	0.20	6	High
L15	3.90	0.78	0.15	0.19	7	High
L4	3.82	0.76	0.14	0.19	8	High
L31	3.82	0.76	0.16	0.21	8	High
L22	3.81	0.76	0.15	0.20	10	High
L6	3.71	0.74	0.12	0.16	11	High
L8	3.70	0.74	0.16	0.22	12	High
L26	3.70	0.74	0.14	0.19	12	High
L16	3.69	0.74	0.15	0.20	14	High
L19	3.67	0.73	0.12	0.16	15	High
L2	3.66	0.73	0.12	0.16	16	High
L25	3.63	0.73	0.12	0.17	17	High
L7	3.62	0.72	0.14	0.19	18	High
L12	3.59	0.72	0.13	0.18	19	High
L11	3.51	0.70	0.14	0.20	20	High
L20	3.51	0.70	0.12	0.17	20	High
L14	3.47	0.69	0.13	0.18	22	Moderate
L29	3.47	0.69	0.14	0.20	22	Moderate
L13	3.46	0.69	0.12	0.17	24	Moderate
L23	3.46	0.69	0.12	0.17	24	Moderate
L21	3.43	0.69	0.16	0.23	26	Moderate
L18	3.37	0.67	0.15	0.22	27	Moderate
L27	3.37	0.67	0.12	0.18	27	Moderate
L28	3.37	0.67	0.15	0.22	27	Moderate
L30	3.34	0.67	0.12	0.18	30	Moderate
L24	3.31	0.66	0.15	0.22	31	Moderate
L32	3.01	0.60	0.20	0.33	32	Moderate

Table 2.
Impact levels of the
labour-related factors
on productivity of
construction
operations

been the major problems amongst the construction contractors in many countries, namely Egypt (Nourhane *et al.*, 2018), India (Dharani, 2015; Ghate and Minde, 2016; Murari and Joshi, 2019), Iran (Ghoddousi *et al.*, 2015), Nigeria (Onyekachi, 2018), South Africa (Windapo, 2016; Orando and Isabirye, 2018), Vietnam (Dinh and Nguyen, 2019) and Zimbabwe (Chigara and Moyo, 2014). Considering the Sri Lankan context, the lack of importance for construction education in school curricula can be the major reason for the skills shortage amongst construction labourers (TVEC, 2017; Silva *et al.*, 2018). Due to the skills shortage, unskilled labourers work as skilled labourers in many building construction projects in Sri Lanka. This makes complications amongst labourers to gain proper work experience and smooth career development, and it also results in poor quality of work outputs. Industry Sector Skills Councils (ISSC) of Sri Lanka highlighted the need for improving the labour training facilities in the Sri Lankan construction sector. ISSC also stated that the industry needs are not sufficiently covered in many training programmes of public sector institutes in Sri Lanka, particularly highlighting the poor cognitive and job-specific technical skills of the Sri Lankan labourers (TVEC, 2017).

3.2 Lack of knowledge/cognitive skills of labourers in construction works

The cognitive skills of labourers occupy a vital role in their processes of thinking, reading, learning, retaining information, paying attention, solving problems, remembering tasks and making decisions. The current study findings reveal that the lack of cognitive skills of

labourers significantly affects the performance and productivity of labour operations in many building construction projects in Sri Lanka. The industry consultative experts stated that the cognitive skills of Sri Lankan labourers in various technical operations (specifically concreting, bar bending, plastering, tiling, welding, electrical works and equipment handling) are required to be significantly improved. [Manoharan et al. \(2021b\)](#) also revealed that the construction training institutions need to have a special focus on the cognitive skills of labourers in concreting, bar bending, plastering, plumbing, tiling, welding, electrical works, understanding drawings, material handling and equipment handling. [Praveen et al. \(2011\)](#) highlighted that the labourers' poor knowledge of understanding drawings and material handling significantly affected the progress of construction activities in Sri Lanka.

3.3 Lack of thinking abilities amongst labourers

Critical thinking abilities are very important for labourers to make good decisions, understand the consequences of actions and solve problems in the work environment. These are also important life skills to make good linkages, perspective taking and communicating. The industry consultative experts stated that mental disabilities, lack of confidence, social conditioning, work pressure and personal problems are the major causes affecting the thinking abilities of labourers in construction. The experts also highlighted the need for regular brainstorming and meditation practices for the labourers at construction sites to improve their thinking abilities.

3.4 Poor discipline of labour

The discipline of labour is very important to carry out work operations in a structure/framework. Most of the Sri Lankan labourers are from a poor educational background, and they are unaware of the established guidelines that need to be followed for work performance and behaviour. The industry experts highlighted the unavailability of employee handbooks, standard operating procedures and employment agreements amongst most Sri Lankan construction firms. The poor discipline of labour has also been a significant factor affecting the productivity of construction operations in other developing countries, namely India ([Dharani, 2015](#)), Indonesia ([Soekiman et al., 2011](#)), Nigeria ([Orando and Isabirye, 2018](#)) and Vietnam ([Dinh and Nguyen, 2019](#)).

3.5 Lack of labour morale/commitment

Labour morale/commitment is the feeling of responsibility that a labourer has towards the goals and expectations of the firm. This significantly contributes to the improvement of labour productivity in construction activities, but the level of enthusiasm that most Sri Lankan labourers have towards their assigned tasks at their workplaces is inadequate. By comparing with Arabian, Chinese, Korean and Malaysian labour forces, which were the leading foreign labour forces in the skill-based ranked list, [Manoharan et al. \(2021b\)](#) highlighted the significant need for improving the commitment of Sri Lankan labourers in construction. The industry consultative experts stated that the secondary education and vocational training institutes in Sri Lanka must have attention to strengthening the soft skills and attitude domain components in the curricula of their education/training programmes. The construction firms also need to ensure the work environment to support the improvement in labour commitment to work.

3.6 Communication problems amongst labourers

This study reports that the poor communication skills of labourers are the major barrier to their teamwork and collaborative work involvement in many building construction projects in Sri Lanka. The industry consultative experts stated that this has resulted in

misunderstandings amongst workers, errors in work, reworks and construction delays. The experts also highlighted the importance of linking the communication policies of construction firms with the quality controlling units since poor communications facilities result in poor work qualities in construction operations. The study also highlights the importance of labourers being well aware of safety communication practices to prevent unexpected injuries in work operations. The workplace injuries significantly contributed to the delays in many construction projects in Sri Lanka (Kesavan *et al.*, 2015). Umar (2017) states that work-related injuries reduce the productivity of workforce operations and incur additional expenditures to the firms, such as clean-up costs, replacement costs, costs resulting from delays, supervision costs and costs related to rescheduling and transportation.

3.7 Poor abilities of reading, understanding, speaking and writing amongst labourers

The study findings show that the poor ability of reading, understanding, speaking and writing amongst labourers resulted in poor labour performance in the construction work environment in Sri Lanka. This has been a major barrier for the labourers to take on challenges and opportunities in their work environment. These abilities are very important for the labourers to learn new things related to work operations and broaden their cognitive, transferrable and self-management skills. Poor childhood education may be the specific reason for the abovementioned poor abilities of Sri Lankan labourers. Similar problems have also been reported by past studies considering Indian (Dharani, 2015; Murari and Joshi, 2019), South African (Windapo, 2016; Orando and Isabirye, 2018), Turkish (Kazaz *et al.*, 2016) and Zimbabwean (Chigara and Moyo, 2014) labour forces working in construction projects.

3.8 Labour absenteeism

This study reports that labour absenteeism has been a significant problem for construction contractors in building construction projects in Sri Lanka. Notably, it also contributed to construction delays in Sri Lanka (Kesavan *et al.*, 2015). The experts' discussions highlighted the less job interest, less motivation, less commitment and work dissatisfaction of labourers as the major reasons for the labour absenteeism in many building construction projects in Sri Lanka. The experts also specified the following factors resulting in less job interest, less motivation and work dissatisfaction amongst Sri Lankan labourers.

- (1) Salary delays and low salaries;
- (2) No labour rewarding mechanisms;
- (3) Lack of proper incentives;
- (4) Improper promotion opportunities;
- (5) Fewer welfare facilities for labourers;
- (6) Lack of job security for labourers and
- (7) Other ways of earning money.

3.9 Work overload

The study specifies that the intensity of the workloads of labourers has an impact on their performance in construction operations. A heavy workload affects the mood and behaviour of workers and causes poor mental focus, low motivation and difficulty in concentrating on work tasks (Semaksiani *et al.*, 2019). This may strain relationships with co-workers and supervisors. Semaksiani *et al.* (2019) also stated that excessive workload causes a decrease in labour morale and labour motivation, resulting in work fatigue. Experts' discussions

highlight the unrealistic project schedules and sequences of construction tasks as the major reasons for the excessive workload of labourers in the Sri Lankan building construction projects. Proper project scheduling improves work efficiency and effective distribution of resources, leading to the reduction of cost and time. Experts highlighted the delays in obtaining permits/approvals from relevant authorities, conflicts in sub-contractors' schedules and delays in subcontractors' work as the major causes for unrealistic project schedules. In addition, experts' discussions revealed that poor time management skills of supervisors and less number of skilled labourers working are also the other factors causing high workloads amongst labourers.

3.10 Reliability and validity of the findings

Overall, the CV values of each factor ensure the reliability and precision of these findings. According to the range of CV values mentioned in the Labour Force Survey Guide 2020 of Canada (Statistics Canada, 2020), the CV values of all factors were within the allowable limit except for "labour strikes (L32)". The reason for the exceeded CV value of L32 can be justified. The levels of effect of L32 may highly vary between the projects since only a few projects might be experienced labour strikes. Further, the L32 is ranked at the bottom of the list. The low mean value can also make an impact on the high CV value of L32. Hence, it does not mean that the CV value highlights the less precision of the result for the factor L32. In addition, the discussion outcomes of the industry consultative workshops and meetings also ensured the validity of the study findings.

4. Conclusions

Overall, the study has displayed the significant labour-related aspects that need to be concerned by the construction management team for improving the productivity of construction operations. The impact levels of the factors presented in this study show how much attention needs to be considered for each aspect related to labour for improving the productivity of construction operations. The study also presented why those factors are critical and how those influence various practices in a construction project. The significant findings of this study have been extensively compared with the past studies considering Sri Lankan and other foreign contexts. The validity and reliability of the study findings were also ensured using comprehensive approaches.

The study highlights the specific need for upgrading the vocational training programmes in the country to strengthen the cognitive, soft and job-specific skills of construction workers. The overall study findings are expected to contribute to the significant changes in management practices and organisational policies towards the long-term sustainability of the construction industry. The study outcomes may push the industry practices to reduce the gap between the organisational policies and labour operations leading to finding out better ways for the fulfilment of needs of construction labourers, as well as improving their lifestyles and life qualities. The study recommends future studies to focus on skills development practices for construction labourers and the development of competencies in labour supervision and labour management within the direct scope of productivity improvement. Accordingly, effective tools and mechanisms can be developed to evaluate performance and productivity levels of labour through work-based training practices. The study findings are limited to the Sri Lankan building construction project-level practices, also within the perspectives of engineers and construction managers, but some of these findings may also be tested in other developing countries in similar scenarios.

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