CONSTRUCTION LABOUR PRODUCTIVITY IN SOUTH AFRICA: CHALLENGES AND POSSIBLE REMEDIES

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Low labour productivity in the construction industry has become a concern for many professionals, not only in South Africa but also in most other developing countries. Earlier studies reveal that South Africa's labour productivity is one of the lowest in the developing world. This has several ways of negatively impacting the nation's economy. Consequently, this paper investigates the critical challenges affecting labour productivity in the South African construction industry, and the possible ways to overcome the identified challenges. Secondary data obtained from the literature review generated 33 challenges which were examined and analysed using the RII to rank the significance level. The 33 identified productivity challenges factors were systematically grouped into 6 clusters revealing five critical labour productivity challenges namely: Quality of site management, ineffective communication, disruption from the local forum group, equipment problems and delay in material delivery. Possible remedies to the identified challenges were highlighted and further discussed.

Keywords: challenges; labour productivity; KZN Province, South Africa

INTRODUCTION

The construction sector plays a vital role in any country's economy. Its various activities across the building and infrastructure lifecycle are the key drivers to achieving socio-economic development goals which can uplift any nation's economy. Nevertheless, in the South African economy Statistics, the construction sector contributes 3.4% to the Gross Domestic Product (GDP). However, KwaZulu Natal (KZN) province contributes 4.2% of GDP to the construction industry. The percentage of the GDP contribution indicates a significant poor performance in this sector. This poor performance in construction projects could be linked to project complexity, inefficiency in the construction process, cost and time overrun, skills shortage, delay in delivery, poor project planning, risk, late delivery of construction materials, fragmentation, and low labour productivity (Bitamba and An, 2020). In the meantime, Hamza *et al. (*2019) reported that low labour productivity in any country could be tailored to the challenges faced by the construction workers, which disrupt the smooth running of day-to-day activities. Construction labour refers to the site workers saddled with one or more responsibilities in producing the construction-related project(s) works on-site. The construction labour can be generally categorized

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Mewomo, M C (2022) Construction Labour Productivity in South Africa: Challenges and Possible Remedies *In:* Tutesigensi, A and Neilson, C J (Eds) *Proceedings of the 38th Annual ARCOM Conference,* 5-7 September 2022, Glasgow, UK, Association of Researchers in Construction Management, 471-480.

into two: Skilled and Unskilled. The measure of those labour productivity is of high importance.

This measure allows the client/contractor to know if the value of money spent and the quality/quantity of work done is at the optimal expected level. Dozi and AbouRizk (1993) described productivity in the construction industry as the unit person-hour (p-h) rate, the ratio of input-output, i.e., the ratio of the input of an associated resource (usually, but not necessarily, expressed in p-hs) to actual output (in creating economic value), performance factor and production rate. To further reiterate the definition for use in the construction industry: Labour productivity is the physical progress achieved per p-h, e.g., p-hs per linear meter of conduit laid or p-hs per cubic meter of concrete poured. Czumanski and Lodding (2012) suggested that assessment and productivity improvement are vital for labour-intensive processes. In the built environment, this has been a source of worry. Construction firms are under pressure to improve their performance based on the quality of work, delivery time, the scope of operation, and more, due to the significantly low contribution to economic growth and increased competition. Malisiovas (2010); Siriwardana and Ruwanpura (2012) agreed that the ratio of finished work to labour hours is known as construction labour productivity (CLP).

However, poor CLP contributes significantly to the frequent delays that affect many projects, resulting in substantial cost overruns and abandoned projects. However, Labour performance over decades has not attained its optimal expected productivity in the construction industry. This is due to some alarming challenges facing labour output on construction sites (Soekiman *et al.,* 2011). This has created a great deal of debate among researchers and construction stakeholders to find lasting solutions to those challenges. There is no doubt that KZN province of South Africa is faced with some challenges which give room for the low contribution of KZN construction industry to the GDP. Therefore, this study seeks to investigate those challenges facing the KZN province construction industry and suggests possible remedies that could avert those challenges.

LITERATURE REVIEW

One of the crucial stages of conducting good scientific research is conducting a literature review on existing knowledge in the study context (Toyin and Mewomo 2023). It is necessary to conduct an overview of the persisting challenges affecting construction labour productivity in the construction industry. This will assist in identifying the challenges that have been evolving over the years and are still prominent in the construction industry. The study conducted in Kuwait by Jarkas and Bitar (2012) identified forty-five challenging factors affecting CLP on construction sites and ranked them according to their level of importance. These challenges were classified into four primary clusters/groups: Technological, management, external, and human/labour.

In the same vein, Robles *et al. (*2014) also identified; shortage or late supply of materials, clarity of the drawings and project documents, clear and daily task assignment, tools or equipment shortages, and level of skill and experience of labourers, as the top five ranked challenges affecting CLP. In addition, Hamza *et al. (*2019) conducted an extensive review on CLP. The authors thoroughly made justice to over 80 articles covering 25 countries, revealing that none of the studies was conducted in the South African construction industry. Also, all the reviewed articles only focused on identifying and ranking the challenges, noting that limited research

has been carried out in South Africa. Therefore, this study is crucial as it may serve as one of the pioneer studies in the context of CLP that suggested possible remedies by seeking South African construction professionals' opinions. Table 1 shows the challenges affecting CLP as identified in various literature reviewed.

Table 1: Challenges facing construction

Code	Challenges facing labour productivity in the construction sites.	Reference
CLPC1	Quality of site management and project management personnel	(Dozi and AbouRizk 1993; Kazaz, Manisali and Ulubeyli 2008)
CLPC2	Ineffective communications	(Sarihi, Shahhosseini and Banki 2021)
CLPC3	Restrictive union rules on its labour member	(Kazaz, Manisali and Ulubeyli 2008)
CLPC4	Weather variability	(Kazaz, Manisali and Ulubeyli 2008)
CLPC5	Non-availability of Materials, Tools, and Equipment.	(Dozi and AbouRizk 1993; Dai, Goodrum and Maloney 2007)
CLPC6	Disruption of power/water	(Muhammada *et al.,* 2015)
CLPC7	Lack of personnel training for supervision and project management.	(Dozi and AbouRizk 1993; Kazaz, Manisali and Ulubeyli 2008)
CLPC8	Rework/change orders	(Dai, Goodrum and Maloney 2007)
CLPC9	Firm reputation	(Kazaz, Manisali and Ulubeyli 2008)
CLP1C0	Crew size and efficiency	(Muhammada *et al.,* 2015)
CLPC11	Delay in material delivery to site and management	(Sarihi, Shahhosseini and Banki 2021)
CLPC12	Foreman changes/Foreman's incompetence	(Dai, Goodrum and Maloney 2007)
CLPC13	Slow approvals and issue of permits	(Dozi and AbouRizk 1993)
CLPC14	Amount of pay per assigned task.	(Kazaz, Manisali and Ulubeyli 2008)
CLPC15	Inadequate planning and scheduling of workflow.	(Kazaz, Manisali and Ulubeyli 2008; Sarihi, Shahhosseini and Banki 2021)
CLPC16	Site congestion	(Dai, Goodrum and Maloney 2007)
CLPC17	Lack of skilful labour with a specific scope of work	(Muhammada *et al.,* 2015; Sarihi, Shahhosseini and Banki 2021)
CLPC18	Bad road access to the site.	(Muhammada *et al.,* 2015)
CLPC19	Absenteeism at work site/ lack of Commitment.	(Sarihi, Shahhosseini and Banki 2021)
CLPC20	Inspection delays.	(Dai, Goodrum and Maloney 2007)
CLPC21	Lack of incentive payments and financial rewards	(Kazaz, Manisali and Ulubeyli 2008)
CLPC22	Design complexity	(Sarihi, Shahhosseini and Banki 2021)
CLPC23	Health and safety conditions	(Aluko, Idoro and Mewomo 2020)
CLPC24	Cultural differences	(Czumanski and Lodding 2012)
CLPC25	Site distance from population centres	(Soekiman *et al.,* 2011; Robles *et al.,* 2014)
CLPC26	Disruptions from the local forum group	(Muhammada *et al.,* 2015; Hamza *et al.,* 2019)
CLPC27	Civil unrest in the vicinity of the project	(Moswane, Aigbavboa and Mewomo 2018)
CLPC28	Site conditions after inclement weather (rain/snow)	(Aluko, Idoro and Mewomo 2020; Moyo, Crafford and Emuze 2021)
CLPC29	Breakdown of plant	(Hamza *et al.,* 2019)
CLPC30	Availability of skilled labour in the vicinity of the project	(Moswane, Aigbavboa and Mewomo 2018; Hamza *et al.,* 2019)
CLPC31	Level of education of labour	(Aluko, Idoro and Mewomo 2020)
CLPC32	Lack of incentive program	(Robles *et al.,* 2014; Hamza *et al.,* 2019)
CLPC33	Working hours.	(Muhammada *et al.,* 2015)

Recently, there has been an increase in the initiatives to improve CLP (Sarihi, Shahhosseini and Banki 2021). The authors reported that many modelling techniques

have been presented, "including the expectancy models, action response models, statistical and regression models, artificial neural networks (ANNs), and expert systems. Those models could function well if the challenges are well identified and have clues on the possible solution from a real-life field survey.

Suggested Possible Remedies (SPR) to Mitigate the Challenges

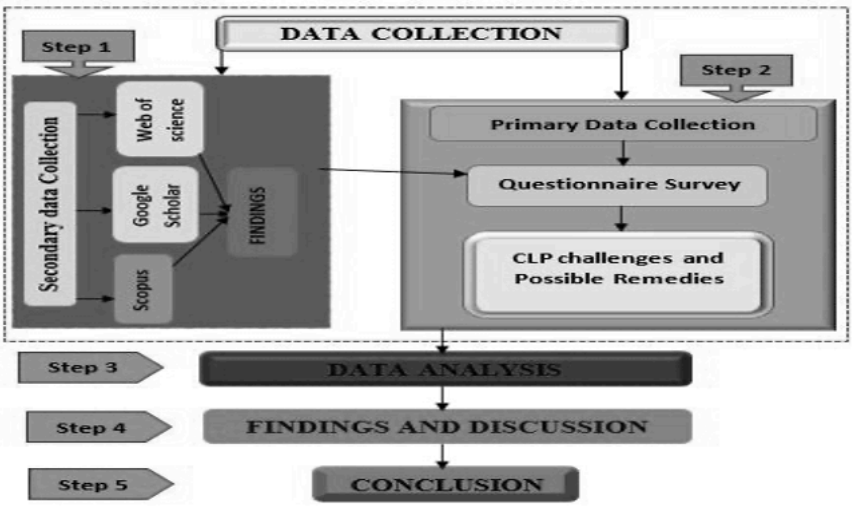
The section presented a review of suggested possible remedies that can be used in mitigating the challenges of CLP. Remedy means the strategies or measures put in place to eradicate challenges, which enhance the efficiency and output of humans or machines. Several measures have been noted in the literature. Hamza *et al. (*2019) mentioned that the construction industry and the government should take proactive measures to train and encourage local people to join the construction industry. The level of supervision and level of skills of craftsmen particularly must be improved. CLP can also be improved by increasing the benefit, satisfaction, and team-building program (Shashank *et al.,* 2014, Ohueri *et al.,* 2018).

Financial incentives have a positive correlation with worker motivation and is an important way to satisfy the basic need of the labourers (Afolabi *et al.,* 2018; Palikhe *et al.,* 2019). Planning software should be used in the project to have proper planning of the work to reduce the frequency of working overtime. Also, material delay and material arrangement, tool and equipment management should be improved by adopting a proper material management system (Ghoddousi and Hosseini, 2012; Afolabi *et al.,* 2018). It is also significant to promote the function of effective management of labour and human resources as this could lead to successful management of construction projects and initiatives (Alaghbari *et al.,* 2019). By avoiding interruptions during the construction phase, project teams can reduce the probability of disputes and costly litigations and claims while instead maintaining healthy business relationships through successful and timely project delivery (Griego and Leite, 2017).

METHOD

This study adopted a quantitative research method as shown in Figure 1. The quantitative research method was used because it focuses on gathering numerical data and generalising it across groups of people.

Figure 1: Research method framework



Also, quantitative studies are undertaken to yield statistical evidence of relationships and their strength, as statistics are very useful in determining directions of relationships when combined with theory and literature. Thus, this research is divided into five (5) processes namely, literature review, questionnaire design, distribution, collection, data analysis, findings and discussion, and conclusion of the study. A similar approach was adopted by Toyin and Mewomo (2021) "review", Moswane *et al. (*2018) and Aluko and Mewomo (2021) who mentioned that quantitative research is a research strategy that indicates the relationship between theory and research and usually emphasizes how theories were generated.

Data collection

The target population for this survey are construction professionals working in KZN province of South Africa. The identified challenges and remedies from the reviewed articles were used to formulate the questionnaire for this study. The targeted respondents were asked to rate the significance of identified challenges on a 5-point Likert scale (1: Not significant; 2: Less significant; 3: Neutral; 4: Significant and 5: Very significant) and "remedies" importance level from 'Not important to very important. The questionnaire was administered and received via Google forms. Out of the 98 questionnaires distributed, 55 were received which represents 56% of the overall received questionnaires. 15.3% of the respondents were females, while 84.7% were males. Although, the sample size received was small, the return rate for this study was considered adequate for analysis (Chan *et al.,* 2018). The structured questionnaire was preferred because of the relative ease of providing standard data suitable for the research economically and quickly (Aluko *et al.,* 2020).

Data analysis

In this study, Cronbach's alpha was used to determine the internal reliability and the internal consistency among factors in the survey questionnaire. Cronbach's alpha test greater than or equal to 0.5 means the scale has relatively good internal reliability (Aluko and Mewomo 2021). Using the SPSS statistical software version 27.0, the computed alpha value was 0.870, indicating that using the five-point Likert scale was reliable at a 5% significance level for the data. The alpha value of 0.870 justifies that the data can proceed for further analysis (Aluko, Idoro and Mewomo 2020). The mean and standard deviation of each variable, according to Faridi and El-Sayegh (2006) and Robles *et al. (*2014), are not adequate measures to analyse global rankings since they do not represent any link between them. Thus, descriptive analysis conducted on the survey data is "relative important index (RII), which involved the computation of representative rating point or a weighted average for the collective ratings made for each variable in the subgroup. Thus, this tool is employed to check the significance level and rank each explored data using SPSS 27.0. Thereafter, the 33 challenge variables were systematically grouped into 6 clusters for easy understanding. A similar method was adapted from Toyin and Mewomo (2023); Toyin and mewomo (2021) and Alaghbari *et al.,* (2019).

FINDINGS

Background Information of Respondents

From the survey result, the 55 respondents entail the following characteristics: Gender [Male 45; Female 15]; Categories of organisation [Large organisation: 20; Medium organisation: 24; Small organisation: 11], CIDB grading [Grade 1-3: 13; Grade 4-6: 17; Grade 7-9: 25]; Sector: [Public: 28; Private: 27], Year of experience[0-5 years 5:11 years: ; 6-10 years: 14 ; 11-15 years: 13 ; more than 15 years: 17].

Analysis of construction Labour Productivityy challenges (CLP)
Table 2, presents the value of the descriptive analysis: Relative (CLPC1, CLPC2, CLPC26 CLPC5, and CLPC11: 0.81, 0.81, 0.81, 0.8, and 0.8, respectively, are ranked as the most crucial challenges facing construction labour productivity in KZN province of South Africa from the respondent's perspective.

Table 2: Analysis of results of Construction Labour Productivity

Code	Challenges facing labour productivity in the construction sites.	Reference
CLPC1	Quality of site management and project management personnel	(Dozi and AbouRizk 1993; Kazaz, Manisali and Ulubeyli 2008)
CLPC2	Ineffective communications	(Sarihi, Shahhosseini and Banki 2021)
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CLPC31	Level of education of labour	(Aluko, Idoro and Mewomo 2020)
CLPC32	Lack of incentive program	(Robles *et al.,* 2014; Hamza *et al.,* 2019)
CLPC33	Working hours.	(Muhammada *et al.,* 2015)

The systematic grouping of the variable result is presented in Table 3.

Table 3: Variables group naming

Group naming	Coding	Variables
Management Related Challenges	MRC (1 - 6)	CLPC1; CLPC7; CLPC9; CLPC13; CLPC15; CLPC33.
Site Organisation Challenges	SOC (1 - 5)	CLPC2; CLPC16; CLPC18; CLPC20; CLPC25.
Labour Related Challenges	LRC (1 - 5)	CLPC3; CLPC10; CLPC19; CLPC26; CLPC31.
Weather and Safety Related Challenges	WSRC (1 - 5)	CLPC4; CLPC23; CLPC24; CLPC27; CLPC28.
Work Disruption Related Challenges	WDRC (1 - 6)	CLPC5; CLPC6; CLPC8; CLPC11; CLPC22; CLPC29;
Incentives and Labour Scarcity Related Challenges	ILSRC (1 - 6)	CLPC12; CLPC4; CLPC17; CLPC21; CLPC30; CLPC32.

Management Related Challenges: These challenges are centred on the company readiness and the on-site construction manager's capabilities to manage and effectively coordinate the construction activities.

Site Organisation Challenges: In any construction project, the knowledge of site organisation, coordination, and communication is vital for the construction managers. The lack of a proper program (construction schedule) could lead to overcrowded labour and machines during the construction process, and these should be avoided.

Labour Related Challenges: The Labour force cannot be neglected in the construction industry, the challenges identified under this cluster are related to the labour guiding policy and their act toward their assigned task.

Weather and Safety-Related Challenges: Proper organisation and adherence to health and safety on-site is crucial to achieving project success. H&S would help to mitigate life lost due to accidents or hazardous occurrences.

Work Disruption-Related Challenges: The challenges linked to this cluster are related to the shortage of materials and availability of tools and equipment, wasteful effort due to rework or complex design understanding issues.

Incentives and Labour Scarcity-Related Challenges: These challenges are motivational or reward-based expectations for the labour which are not readily in place and the unavailability of labour. These factors could affect the commitment of labour towards the task assigned to them.

From the survey, 'inconsistencies in monitoring and evaluation projects tools; delayed payments; non-recognition of the labour group; poor PPE; skill transfer difficulties and poor-quality control compliance' were identified as additional productivity challenges in KZN.

Possible Remedies: The suggested possible remedies were administered to the respondents to rank their level of importance on a 5-point Likert scale. The result indicated that all the identified 16 remedies were crucial, with RII values ranging from 0.80 to 0.86 and a mean item score of 4.00 to 4.36, as shown in Table 4.

CONCLUSIONS

This study investigated the challenges affecting construction labour productivity in KZN province of South Africa. Thirty-three challenges were identified from the existing literature which were grouped into six clusters namely: Management Related Challenges; Site Organisation Challenges; Labour Related Challenges; Weather and

Safety-Related Challenges; Work Disruption Related Challenges; Incentives and Labour Scarcity Related Challenges; on which both the descriptive and inferential statistics were conducted.

Table 4: Suggested possible remedies

Code/Suggested Remedies	Mean	Std. D	RII
SPR1: Availability of adequate H&S provision on site	4.22	.917	0.84
SPR2: Building up employee confidence	4.24	.881	0.85
SPR3: Good working condition	4.25	.821	0.85
SPR4: Adequate provision of PPE	4.18	.841	0.84
SPR5: Good use of employees working standard time	4.00	.903	0.8
SPR6: Good welfare facilities	4.07	.790	0.81
SPR7: Good and effective management practices	4.25	.799	0.85
SPR8: Stimulating workers commitment	4.11	.809	0.82
SPR9: Teamwork approach	4.27	.827	0.85
SPR10: Use of incentives	4.05	1.061	0.81
SPR11: Upholding employees right	4.02	.972	0.8
SPR12: Good management accessibility approach	4.11	.956	0.82
SPR13: Training of workers for new skills	4.31	.858	0.86
SPR14: Improved construction methods	4.11	.875	0.82
SPR15: Good coordination of construction activities	4.11	.936	0.82
SPR16: Good site organisation	4.36	.677	0.87

The result of the descriptive analysis (RII) reveals 5 critical labour productivity challenges namely quality of site management, ineffective communication, disruption from the local forum group, equipment problems and delay in material delivery. In addition, this study identified sixteen possible remedial/preventive measures to the identified productivity challenges which if utilised will not only promote CLP but will create an appreciable positive effect on the SA economy and the socio-economic welfare of its citizens.

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