EXAMINING THE FACTORS INFLUENCING LABOUR OUTPUT ON CONSTRUCTION PROJECTS IN GHANA

Ebenezer OKANTA and Emmanuel BAMFO-AGYEI, Christopher AMOAH

Keywords: *Construction. firms. labour. output. projects*

ABSTRACT

Labour output plays a crucial role in the successful completion of construction projects, particularly in developing countries where labour-intensive methods dominate project execution. This study investigates the factors influencing labour output, its impacts on construction project performance and the measures that can enhance output within the construction sector in Ghana, with a focus on Cape Coast Metropolis. The research was guided by three objectives: to identify the key factors influencing labour output, to assess the impact of labour output on construction projects, and to determine measures to improve output levels. A quantitative research design was chosen and data were gathered through structured questionnaires delivered to 200 respondents, including quantity surveyors, site supervisors, foremen and masons. Descriptive statistics such as frequencies, percentages, mean scores, standard deviations and rankings were used to summarize the data, while Principal Component Analysis (PCA) was carried out to derive the underlying dimensions of labour output. The findings revealed that labour output is influenced by three interrelated dimensions: human capacity, management practices and health and safety measures. Training on modern tools, worker skills and competencies, experience, effective planning, coordination, and incentive schemes were underlined as key determinants of labour output, while worker fitness, wellness, and maturity were also considered as significant contributors. The study deeper founded that labour output influences project performance through two main dimensions: time and cost efficiency also quality and client satisfaction. High output was associated with timely delivery, decreased cost overruns, and improved client outcomes, while low output resulted in delays, rework and wastage of resources. Measures to improve labour output were grouped into three strategic components: safety and health interventions, resource and planning systems, and technology and innovation adoption. These included behaviour-based safety programmes, knowledge management systems, supplier partnerships, modern equipment, and innovative practices such as drone monitoring. The study concludes that labour output is of manifold and that improving output demands an integrated approach that balances human, managerial, and health and safety considerations with modern technological innovations. The study contributes to existing knowledge by providing an integrated framework for understanding and improving labour output in Ghana's construction sector, and also highlighting the understudied influence of institutional and policy support. These findings are valuable for construction practitioners, policymakers and other researchers seeking to address the persistent challenges of low labour output, cost overruns and project delays in the Ghanaian construction sector.

EXAMINING THE FACTORS INFLUENCING LABOUR OUTPUT ON CONSTRUCTION PROJECTS IN GHANA

Ebenezer OKANTA and Emmanuel BAMFO-AGYEI, Christopher AMOAH

INTRODUCTION

The construction industry, it plays a significant role in the nations socio-economic development, contributing to infrastructure development and employment generation (Callistus et al., 2014). However, the industry faces persistent challenges related to labour output which significantly impact project timeline, cost efficiency and overall project success. Despite the labour intensive of construction projects, there is a luck of coordinated policy framework to enhance labour output leading to inefficiencies and cost overruns (Acquah et al., 2021).

Empowering employees to meet their needs and providing problem-solving services are seen as the most effective ways to please people and help them perform well at work (Gyamfi et al., 2020). Identifying the factors that impact an employee's output is crucial to the success of the construction industry. As a result, there is a need for production-boosting measures (Acquah et al., 2021).

Several studies have identified factors such as payment delays, poor communication between managers and labourers, poor labour supervision, and a shortage of materials as critical barriers to output in the construction sector (Jarkas, 2015). This study aims to address the gap by providing an integrated framework that connects human capacity, management practices, and health and safety conditions. The aim of the study is to investigate the factors that influence labour output on construction projects in Ghana, with a view to providing measures to improve labour output. The **o**bjectives of the study are to: identify the key factors that influence labour output on construction projects; assess the impact of labour output on construction projects; and find the measures to improve labour output on construction projects

2.2 Labour Output

Labour is absolutely necessary in the building sector. Labour output is frequently measured by comparing workers' expenditures to the quantity of items produced. Labour is any activity that requires physical or mental effort. It is regarded as a critical resource in construction because it integrates other resources, including materials, plant equipment, and capital, to produce a range of building products (Acquah et al., 2021). Manpower is recognised as the most significant and versatile resource in construction projects, with construction output directly related to manpower (Hamza et al., 2022).

Labour output is crucial to project performance, and low labour output is a major cause of cost and schedule overruns in construction projects (Alaghbari et al., 2019). This decrease in labour output, combined with a nationwide labour shortage, threatens the future of investment in the construction sector. Labour production accounts for one-third to one-half of overall project costs (Tsehayae & Robinson Fayek, 2014). Construction projects use a large number of people,

making personnel the most productive resource; hence, construction output strongly depends on human effort, efficiency, and performance (Hamza et al., 2022).

2.3 Factors Influencing Labour Output on Construction Projects.

Many studies have investigated the elements that influence construction worker output over the years (Alaghbari et al., 2019). One of the most formidable challenges for project managers in the construction industry is identifying and assessing factors that affect construction labour output. Poor supervision, low morale, insufficient training, and a hazardous working environment are all linked to intrinsic worker motivation (Amae, 2020).

Five variables have been identified as affecting labour output: management (delayed inspections), tools and equipment (insufficient tools and equipment), personnel (work safety), and external factors (site conditions and supply shortages). According to the authors, the most significant risk for contractors is the loss of output due to a shortage of critical supplies, equipment, and labour (Bamfo-Agyei et al., 2022). According to Gopal & Murali (2015), there are 13 key aspects that impact labour output and they are labour skill, building ability, quality of supervision, working day length, working method, incentive scheme, complexity of construction data, crew number and composition, power tool availability, site layout, absenteeism, total number of activities on-site, proportion of work subcontracted.

Jarkas (2015) also investigated the factors influencing labour performance in the construction sector and selected the following as the most important: the extent of changes in instructions during execution, level of coordination among design disciplines, clarity of technical specifications, proportion of work subcontracted, level of design complexity, lack of incentive scheme, lack of labour supervision, lack of leadership by the construction manager; stringent inspection by the engineer; and delay in responding to information requests.

Furthermore, Irfan et al. (2020) classified twenty-six labour output elements into five categories: work condition-related factors, site conditions factors, motivational factors, workforce-related factors, and project management-related factors. Lack of labour supervision has the greatest impact on labour output, followed by unrealistic scheduling, a shortage of experienced skilled labour, a lack of construction management experience, delays in requesting information, delays in paying wages to labour, poor communication on the job site, and inclement weather. According to Alyew et al. (2020), human resources are among the essential components of construction projects. As a result, improving labour output is the primary driver of output growth in the building industry. From their research, they identified 45 variables that adversely affect worker performance in construction projects in the Gaza Strip and ranked them by relative relevance. They grouped the variables into 10 categories: leadership, supervision, motivation, time, tools and materials, project, safety, quality, external influences, and personnel.

Similarly, Akbar et al. (2021) found that labour output is a key factor influencing project performance in the construction industry, affecting time and cost. It also enables the industry to improve overall production, thereby boosting the country's economic growth. As far as we know, no research has been conducted to examine the role of various factors, such as

management factors, material factors, design and technical factors, labour factors, supervision factors, equipment factors, policy, political and legal factors, environmental factors, and motivational factors, on labour output.

3.0 METHODOLOGY

3.1 Research Design

The main design employed for this study was a descriptive survey as it seeks to gain a comprehensive understanding of the factors influencing labour output on construction projects. Specifically, the research design seeks to evaluate the factors influencing labour output on construction projects in Cape Coast metropolis. This design enables the use of numerous data-gathering techniques to address the study topics in detail. Qualitative data were therefore sought and utilised to understand the perceived impact of labour output on projects and to identify measures to improve labour output. This study will employ a single-method approach, that is, quantitative research methods, to gain a better understanding of labour output on construction projects.

3.2 Quantitative Research

Quantitative research encompasses a range of methods for systematically investigating social phenomena using statistical or numerical data (Watson, 2015). Quantitative research is a systematic methodology that focuses on collecting and analyzing numerical data to test hypotheses, measure variables, or establish relationships within a population. It emphasises objectivity, statistical rigour, and generalizability, often utilising structured methods such as surveys, experiments, or statistical modelling to produce reliable and replicable results (Creswell & Creswell, 2022). Quantitative research is known as the science of numbers(Liamputtong, 2013).

3.3 Population

The entire population for the research is two hundred and eighty (280) individuals, which includes project managers, site supervisors, site foremen, architects, quantity surveyors, and masons acquired from over twenty (20) construction firms in Cape Coast metropolis.

3.4 Sample and Sample Technique

3.4.1 Sample Technique

A purposive sampling technique was used to select site supervisors, quantity surveyors, foremen, and masons in construction firms, as the research focused on construction firms. Liamputtong (2013), defined purposive sampling as a deliberate selection of specific events, individuals, or settings because of the crucial information they can provide, which cannot be obtained as adequately through other channels.

3.4.2 Sample

Sampling is the selection of a subset of individuals from a population to estimate the characteristics of the whole population (Singh & Masuku, 2014). A total of two hundred (200) individuals who qualify as key informants for the research participated in the study. They are made up of the following: fifty-four (54) site supervisors, thirty (30) quantity surveyors,

seventy-six (76) foremen and forty (40) masons from the construction firms in the case study area; Cape Coast metropolis.

3.5 Research Instrument(s)
The research instrument which was used for this study was; structured questionnaires.

3.5.1 Structured Questionnaires
Structured questionnaires are research instruments that consist of a collection of pre-defined questions with predetermined response alternatives, meant to obtain quantitative data from respondents (Creswell, 2014). A survey questionnaire is designed to collect quantitative data on the factors influencing construction labour output, impact of labour output on projects, and measures to improve output. Closed-ended rated questions were included to quantify the prevalence of specific factors, such as lack of materials, increase in project cost, and effective supervision, as well as their impact on project performance. The questionnaire was distributed to the 200 selected site supervisors, quantity surveyors, foremen and masons via online platforms, such as Google Forms, and in-person delivery where necessary, to ensure accessibility and a high response rate.

3.6 Data Collection Procedure
The data collection process involved obtaining informed consent from all participants to ensure ethical compliance. Structured questionnaires were distributed to the 200 selected participants, including site supervisors, quantity surveyors, foremen and masons in Cape Coast metropolis via online platforms (Google Forms) and in-person delivery, with follow-up reminders to maximise response rates. All data collection adhered to ethical guidelines, ensuring confidentiality and anonymity, with data securely stored.

3.7 Method of Data Presentation & Analysis.
Quantitative data from structured questionnaires were analysed using descriptive statistics (Mean Scores, and Rankings) to analyse feedback on factors influencing labour output on projects, their impacts, and measures for improvement. Factor analysis **(**Principal Component Analysis - PCA) with Varimax rotation was used to identify the underlying dimensions of labour output. Variance-Explained and Rotated Factor Matrices were used to confirm the extracted factors.

4.0 RESULTS AND DISCUSSION
4.1 Demographic Characteristics of Respondents
Understanding the demographic profile of respondents is important in establishing the background against which labour output in the construction industry is assessed. The demographic data captured included age, gender, role in construction, and years of experience.

Table 1: Demographic Profile of Respondents

Variable	Category	Frequency	Percentage (%)

Gender	Female	15	7.5
	Male	182	91.0
	Prefer not to say	3	1.5
Age Group	18-25	18	9.0
	26-35	28	14.0
	36-45	74	37.0
	46 and above	80	40.0
	Total	200	100.0
Role in construction	foremen	76	38.0
	Masons	40	20.0
	Quantity surveyors	30	15.0
	Site supervisors	54	27.0
	Total	200	100.0
Years of experience	1-5 years	33	16.5
	6-10 years	77	38.5
	Less than 1 year	8	4.0
	More than 10 years	82	41.0
	Total	200	100.0

Source: Field Survey (2025).

The demographic profile of respondents revealed that the construction industry is largely male dominated, with 91% of participants being male compared to only 7.5% female, while 1.5% preferred not to disclose their gender. In terms of age distribution, the majority of respondents were within the 46 years and above category (40%), followed by those aged 36–45 years (37%), indicating that the industry is largely driven by a more mature and experienced workforce, while younger groups (18–25 years, 9% and 26–35 years, 14%) were less represented. Regarding roles in construction, foremen accounted for the largest share (38%), followed by site supervisors (27%), masons (20%), and quantity surveyors (15%), suggesting that operational and supervisory roles dominate the sector relative to managerial positions. Finally, the analysis of years in operation indicated that most firms had been in existence for more than 10 years (41%) or between 6–10 years (38.5%), while only 16.5% had operated between 1–5 years and 4% for less than a year, which implies that the responses were largely drawn from stable and well-established firms.

4.2 Key factors influencing labour output on construction projects

Labour output is a critical determinant of project success in the building sector. Understanding the factors that influence labour output can help project managers optimise workforce performance, lower delays, and enhance overall project efficiency. Numerous elements, including worker skills, training, health, experience, and effective project management, have been identified as key contributors to labour performance.

Table 2: Key Factors Influencing Labour Output on Construction Projects

factors that influence labour output on construction projects	Mean Score	Standard Deviation	Rank
Workers trained on modern equipment and tools influence labour output.	4.36	1.027	1
Health and wellness programs positively influence worker performance.	4.32	0.789	2
Work planning and scheduling effectiveness influences labour output.	4.26	0.888	3
Worker skill level and competency influence labour output.	4.18	0.871	4
Physical fitness and health condition of workers influence labour output.	4.11	0.858	5
Age and maturity of workers influence their output.	4.09	1.037	6
Years of experience of individual workers affect their output.	4.05	0.873	7
Worker familiarity with specific construction methods influences output.	3.96	0.942	8
Effective coordination between different trades enhances overall output.	3.86	0.917	9
Performance-based incentives and bonuses affect labour output.	3.76	1.007	10

Source: Authors Contrast, 2025

The analysis of key factors influencing labour output on construction projects shows that employees trained on modern tools and equipment ranked first, with a mean score of 4.36, highlighting the significance of continuous training in improving labour output. This aligns

with other studies that emphasised the role of technology adoption and workforce training in improving efficiency on various construction sites (Enshassi et al., 2007). Health and wellness programmmes followed closely with a mean of 4.32, developing an idea that employee well-being significantly affects performance, consistent with findings by Jarkas & Bitar (2012) who argued that healthy workers exhibit an improved level of output.

Work planning and scheduling effectiveness (M = 4.26) and worker skill and competency (M = 4.18) were also highly rated, showing that both management practices and individual capabilities are important elements to labour output. This observation matches with Sambasivan and Soon (2007), who stated that poor planning and lack of skills form part of the most critical causes of reduced construction output. Similarly, physical fitness and health condition (M = 4.11) and age and maturity of workers (M = 4.09) also influenced output, reflecting the significance of worker characteristics on project output. This view was supported by Durdyev et al. (2018).

Furthermore, years of experience (M = 4.05) and familiarity with construction methods (M = 3.96) were recognised as enhancing performance, supporting the idea that practical knowledge and industry exposure are important for efficiency (Ayodele et al., 2020). Coordination between trades (M = 3.86) and performance-based incentives (M = 3.76) ranked lower but remained relevant. While financial incentives can motivate workers, their effectiveness relies on good implementation, as backed by previous studies (Fagbenle et al., 2011).

4.3 Impacts of labour output on construction projects

Labour output is a critical determinant of the overall performance and success of construction businesses. The efficiency, skill and output of employees directly affect project timelines, costs, quality and resource utilisation. High labour output can contribute to faster accomplishment of tasks, reduced delays and improved adherence to project schedules, while low output may result in cost overruns, extended timelines, and compromised quality.

Table 3: Labour Output Impact on Construction Projects

Impact of labour output on construction projects	Mean Score	Standard Deviation	Rank
Labour output is the most critical factor affecting project performance.	4.32	1.007	1
Worker retention correlates with improved project completion times.	4.12	0.976	2
Low labour output contributes to project delays and cost overruns.	4.02	0.864	3
Poor output leads to rework and wasted resources.	3.92	0.849	4
High labour output improves client satisfaction and quality of finishes.	3.82	0.898	5

Source: Authors' contrast, 2025

The findings in Table 4.21 reveal that labour output is regarded as the most critical factor affecting project performance (M = 4.32), underscoring the central role of workforce output in achieving construction objectives. This is consistent with Jarkas and Bitar (2012), who emphasised that labour output is a primary determinant of project success. Worker retention, with a mean of 4.12, was ranked second, indicating that maintaining a stable and skilled workforce enhances project completion times, a view supported by Durdyev et al. (2018), who argued that high turnover disrupts workflow and reduces efficiency.

Low labour output (M = 4.02) was strongly associated with project delays and cost overruns, echoing Sambasivan and Soon (2007), who identified poor output as a major cause of time and cost overruns in construction projects. Similarly, poor output leading to rework and wasted resources (M = 3.92) highlights the inefficiencies that arise when quality is compromised, a challenge also discussed by Enshassi et al. (2007). Finally, high labour output's contribution to client satisfaction and quality of finishes (M = 3.82) indicates that output not only influences cost and time but also project quality, aligning with Alaghbari et al. (2019), who linked efficient workforce performance with improved client outcomes.

4.4 Measures to improve labour output on construction projects

Improving labour productivity is essential to enhancing construction output, limiting project delays, and ensuring quality. Several strategies can be implemented to boost workers' efficiency, including training programs, proper supervision, performance incentives, effective planning, and provision of adequate tools and equipment.

Table 4: Measures to Improve Labour Output on Construction Projects

measures to improve labour output on construction projects	**Mean Score**	**Standard Deviation**	**Rank**
Implementing behaviour-based safety programs would enhance labour output.	4.29	0.972	1
Improving material quality control and inspection would improve output	4.20	0.81	2
Providing employee empowerment initiatives would enhance output	4.12	0.848	3
Adopting knowledge management system would enhance learning and output	4.06	0.86	4
Establishing strategic partnership with suppliers would improve output	3.99	0.931	5
Investing in modern high-quality tools and equipment would improve output	3.93	1.023	6

Implementing team building activities and programmes would improve labour output	3.85	0.969	7
Using drones for site monitoring and progress tracking would enhance output.	3.74	1.002	8
Establishing regular feedback and performance review system would improve labour output	3.66	0.983	9
Creating and creativity programmes would improve problem solving efficiency	3.60	1.028	10

Source: Authors contrast, 2025

The results in Table 4.4 indicate that the most highly rated measure to improve labour output is the implementation of behavior-based safety programs (M = 4.29), reflecting the critical role of occupational safety in sustaining output. This finding supports the argument of Durdyev et al. (2018) and Jarkas and Bitar (2012), who noted that unsafe work environments contribute to accidents, absenteeism, and low output, while strong safety systems enhance performance. The second-ranked measure, improving material quality control and inspection (M = 4.20), emphasises the importance of reliable materials for uninterrupted work, consistent with Sambasivan and Soon (2007), who found poor material quality and delays in supply to be major causes of output loss.

Employee empowerment initiatives (M = 4.12) and the adoption of knowledge management systems (M = 4.06) also scored highly, underscoring the significance of worker motivation and organisational learning in construction output. These are aligned with findings by Enshassi et al. (2017), who argued that empowering workers fosters responsibility, while knowledge sharing reduces errors and rework. Other relevant measures included strategic supplier partnerships (M = 3.99) and investment in modern equipment (M = 3.93), both of which directly impact efficiency by ensuring timely access to resources and tools, as noted by Alaghbari et al. (2019).

Lower-ranked but still relevant measures included team-building activities (M = 3.85), use of drones for site monitoring (M = 3.74), and regular feedback systems (M = 3.66), which highlight the role of collaboration, technology adoption, and performance management in boosting output. The least rated measure was innovation and creativity programs (M = 3.60), although research by Fagbenle et al. (2011) suggests that fostering innovation may have long-term output benefits even if its immediate impact is less visible.

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The study concludes that labour output in construction projects is basically multidimensional. Human capacity, encompassing skills, training, and experience, plays a crucial role in shaping performance. However, output is equally dependent on sound management practices such as planning, coordination, and incentive systems, as well as health and safety conditions that sustain workforce wellbeing.

Labour output place a decisive influence on project outcomes. When output is high, projects are delivered on time, within budget and with high-quality finishes that enhance client satisfaction. When output is low, delays, cost escalations and rework become common, compromising overall performance.

Again, the study concludes that effective strategies for improving output must integrate safety, planning, and innovation. Safe working environments, reliable management systems and adoption of modern technologies together provide the foundation for long-term improvements in labour output.

5.5 Recommendations

In light of the findings and conclusions, the study makes the following recommendations:

1. Invest in training and skills development**:** Construction companies should prioritize continuous training and upskilling of workers, especially in the use of modern tools and methods.
2. Strengthen management practices: Effective planning, supervision, and coordination should be institutionalised, with performance incentives incorporated to motivate the workforce.
3. Prioritise health and safety**:** Behaviour-based safety programmes, wellness initiatives, and ergonomic interventions should form a core part of workforce management.
4. Introduce technology and innovation**:** Firms should embrace modern equipment, site-monitoring technologies such as drones, and programmes that encourage innovation and problem-solving.
5. Improve worker motivation and engagement**:** Empowerment initiatives, performance-based rewards, and team-building activities should be encouraged to foster responsibility and commitment among workers.
6. Improve resource and supply chain management**:** Knowledge management systems and strong supplier partnerships should be leveraged to ensure resource availability and efficient project finishing.

REFERENCES

Acquah, J. H., Danso, H., & Bamfo-Agyei, E. (2021). Determination of Factors That Influence Labour Output On Construction Sites In Ghana.

Akbar, M., Darkwah, K. K., Amin, A., Huali, P., Guoqiang, O., & Asghar, M. (2021). The Factors Affecting Labour Productivity in the Construction of Prestressed Concrete Buildings in Ghana. ENGINEERING. https://doi.org/10.20944/preprints202104.0147.v1

Alaghbari, W., Al-Sakkaf, A.A., & Sultan, B. (2019). Factors affecting construction labour productivity in Yemen. *International Journal of Construction Management*, 19(1), 79–91. https://doi.org/10.1080/15623599.2017.1382091

Amae, K. K. D. (2020). Determinants of labour productivity of site operatives in Ghana: perception of the site managers. Project Management Scientific Journal, 4(8). and Their Impacts on Project Performance.

Ayodele, O. A., Chang-Richards, A., & González, V. (2020). Factors affecting workforce turnover in the construction sector: A systematic review. *Journal of construction engineering and management*, 146(2), 03119010.

Bamfo-Agyei, E., Thwala, D. W., & Aigbavboa, C. (2022). Performance improvement of construction workers to achieve better productivity for labour-intensive works. *Buildings*, 12(10), 1593.
Creswell, J. W. (2014). Research design: Qualitative, quantitative, and mixed methods approaches (4th ed.). SAGE Publications.
Creswell, J. W. (2014). Research design: Qualitative, quantitative, and mixed methods approaches. Sage Publications
Creswell, J. W., & Creswell, J. D. (2022). Research design: Qualitative, quantitative, and mixed methods approach (6th ed.). SAGE Publications.
Creswell, J. W., & Creswell, J. D. (2022). Research design: Qualitative, quantitative, and mixed methods approaches (6th ed.). SAGE Publications
Danso, H. (2014). Poor workmanship and lack of plant/equipment problems in the construction industry in Kumasi, Ghana. *International journal of management research,* 2(3), 60-70
Durdyev, S., & Hosseini, M. R. (2019). Causes of delays on construction projects: A comprehensive list. *International Journal of Managing Projects in Business*, 13(1), 20–46. ttps://doi.org/10.1108/IJMPB-09-2018-0178
Durdyev, S., Ismail, S., & Hosseini, M. R. (2018). Labor productivity in construction projects: Major factors influencing performance. *International Journal of Construction Management*, 18(4), 276–285. https://doi.org/10.1080/15623599.2017.1361143
Ekwuno, A. O. (2022). Research To Study the Damage Caused To The Construction Projects Due To The Lack Of Workers On Site. *International Journal of Scientific and Research Publications,* 12(12), 361–382. https://doi.org/10.29322/IJSRP.12.12.2022.p13241
Emmitt, S., & Gorse, C. A. (2007). *Communication in construction teams*. Taylor & Francis.
Enshassi, A., Mohamed, S., Mustafa, Z. A., & Mayer, P. E. (2007). Factors affecting labour productivity in building projects in the Gaza Strip. *Journal of civil engineering and management*, 13(4), 245-254.
Fagbenle Olabosipo, I., Ogunde Ayodeji, O., & Owolabi James, D. (2011). Factors affecting the performance of labour in Nigerian construction sites. *Mediterranean journal of social sciences*, 2(2), 251-257.
Fangel, M. (1984). Planning project start-up. *International Journal of Project Management*, 2(4), 242–245. https://doi.org/10.1016/0263-7863(84)90043-7
Frimpong, B. E., Sunindijo, R. Y., & Wang, C. (2020). Towards Improving Performance of the construction Industry in Ghana: A SWOT Approach. *Civil Engineering Dimension*, 22(1), 37–46. https://doi.org/10.9744/ced.22.1.37-46
Gamil, Y., & Abd Rahman, I. (2023). Studying the relationship between causes and effects of poor communication in construction projects using PLS-SEM approach. *Journal of Facilities Management*, 21(1), 102–148. https://doi.org/10.1108/JFM-04-2021-0039
Gnanothayan, J. G., & Kauškale, L. (2022). Development of the construction industry and its interconnection with the development of national economy of Sri Lanka. Baltic Journal of Real Estate Economics and Construction Management, 10(1), 106-112.
Gopal, T. S. R., & Murali, K. (2015). A critical review on factors influencing labour productivityin construction. *IOSR Journal of Mechanical and Civil Engineering*, 12(5), 47-51.
Graduate, Department of Built Environment, Central University of Technology, Ntili, M., Emuze, F., Associate Professor, Department of Built Environment, Central University of Technology, Monyane, T., & Lecturer, Department of Built Environment, Central University of

Technology. (2015). The Impact of Substance Abuse in Construction: Examples from Bloemfontein, South
Graue, C. (2015). QUALITATIVE DATA ANALYSIS. *International Journal of Sales, Retailing & Marketing*, 4(9).17(1), 2–3. https://doi.org/10.1136/eb-2013-101603
Gupta, V., & Kansal, R. (2014). IMPROVEMENT OF CONSTRUCTION LABOR PRODUCTIVITY IN CHAMBAL REGION. *International Journal of Research in Engineering and Technology*, 03(10), 34–37. https://doi.org/10.15623/ijret.2014.0310006
Gurmu, A. T. (2019). Identifying and prioritizing safety practices affecting construction labour productivity: An empirical study. *International Journal of Productivity and Performance Management*, 68(8), 1457–1474. https://doi.org/10.1108/IJPPM-10-2018-0349
Gurmu, A. T. (2020). Construction materials management practices enhancing labour productivity in multi-storey building projects. *International Journal of Construction Management*, 20(1), 77–86. https://doi.org/10.1080/15623599.2018.1462447
Gurmu, A. T. (2020b). Fuzzy synthetic evaluation of human resource management practices influencing construction labour productivity. *International Journal of Productivity and Performance Management*, 70(2), 256–276. https://doi.org/10.1108/IJPPM-04-2019-0198.
Gurmu, A. T., Aibinu, A. A., & Chan, T. K. (2016). A study of best management practices for enhancing productivity in building projects: Construction methods perspectives. *Construction Economics and Building*, 16(3), 1–19. https://doi.org/10.5130/AJCEB.v16i3.4882
Gurmu, A. T., Aibinu, A. A., & Toong Khuan, C. (2016). A study of best management practices for enhancing productivity in building projects: construction methods perspectives. Construction Economics and building, 16(3), 1-19.
Gyamfi, T. A., Nana-Addy, E., & Gyadu-Asiedu, W. (2020). Motivational Strategies to Improve Artisan's Productivity in the Construction Industry in Ghana. *Journal of Building Construction and Planning Research*, 8(04), 285
Hair, J. F. (2009). *Multivariate data analysis*.
Hale, A. R., Heming, B. H. J., Carthey, J., & Kirwan, B. (1997). Modelling of safety management systems. *Safety Science*, 26(1–2), 121–140. https://doi.org/10.1016/S0925- https://doi.org/10.1016/S0925-7535(97)00034-9
Hamza, M., Shahid, S., Bin Hainin, M. R., & Nashwan, M. S. (2022). Construction labour productivity: Review of factors identified. *International Journal of Construction Management*, 22(3), 413–425. https://doi.org/10.1080/15623599.2019.1627503
Hasan, A., Baroudi, B., Elmualim, A., & Rameezdeen, R. (2018). Factors affecting construction productivity: A 30-year systematic review. *Engineering, Construction and Architectural Management*, 25(7), 916–937. https://doi.org/10.1108/ECAM-02-2017-0035.
Hayford, J. K. T., Eccles, T., Fong, D., & Ebohon, J. O. (2022). *Development of Conceptual Motivational Framework to Improve Construction Labour Productivity in the U.K.*
Hickson, B. G., & Ellis, L. A. (2013). *Factors affecting Construction Labour Productivity in Trinidad and Tobago.*
Hussain, A. M. A., Othman, A. A. E., Gabr, H. S., & Aziz, A. T. A. (2018). *CAUSES AND IMPACTS OF POOR COMMUNICATION IN THE CONSTRUCTION INDUSTRY*.
Idowu, A. O., & Aligamhe, V. I. (2023). *Effect of Payment delay on Time performance of Construction Projects in Edo State, Nigeria.*
Ikechukwu, U. F., & Anekwe, M. C. (2015). Establishing Appropriate Labour Output Rate for Increased Site Work Productivity of Building Projects in Owerri Metropolis, Imo State,

Nigeria. *An International Journal of Economic Development Research and Investment*: ICIDR, 51-62.
Irfan, M., Zahoor, H., Abbas, M., & Ali, Y. (2020). Determinants of labor productivity for building projects in Pakistan. Journal of Construction Engineering, Management & Innovation, 3(2), 85-100.
Ismail, M., & Fathi, M. S. (2020). Leadership in Construction: Leadership Styles Practiced in Construction Project – A Review. *Journal of Advanced Research in Business and Management Studies*, 13(1), 24–30.
Jamir Singh, P. S., Oke, A. E., Aliu, J., Isaiah Kayode, T., Azura Ramli, R., & Haizzan Yahaya, M. (2025). Building safely, living well: Combating substance abuse in the construction industry.
Jarkas, A. M. (2015). Factors influencing labour productivity in Bahrain's construction industry. *International Journal of Construction Management*, 15(1), 94–108. https://doi.org/10.1080/15623599.2015.1012143
Jarkas, A. M., & Bitar, C. G. (2012). Factors affecting construction labor productivity inKuwait. *Journal of construction engineering and management*, 138(7), 811-820.
Jarkas, A. M., Al Balushi, R. A., & Raveendranath, P. K. (2015). Determinants of construction labour productivity in Oman. *International Journal of Construction Management*, 15(4), 332–344. https://doi.org/10.1080/15623599.2015.1094849
Jergeas, G. F., & Ruwanpura, J. (2010). Why cost and schedule overruns on mega oil sands projects?. Practice Periodical on Structural Design and Construction, 15(1), 40-43.
Jimoh, R., Oyewobi, L., Suleiman, S., & Isa, R. (2017). Influence of supervision on labour productivity on construction sites in Abuja-Nigeria. *Independent Journal of Management & Production*, 8(1), 64–81.
Jusoh, Z. M., & Kasim, N. (2017). Influential Factors Affecting Materials Management in Construction Projects. *Management and Production Engineering Review*, 8(4), 82–90. https://doi.org/10.1515/mper-2017-0039
Kaiser, H. F. (1974). *An index of factorial simplicity. psychometrika*, 39(1), 31-36.
Karim, N. A., Hassan, S., Yunus, J., & Hashim, M. (2013). Factors influence labour productivity and the impacts on construction industry. Caspian Journal of Applied Sciences Research, 2(August), 349-354.
Karthik, D., & Kameswara Rao, C. B. (2022). Identifying the significant factors affecting the masonry labour productivity in building construction projects in India. *International Journal of Construction Management*, 22(3), 464–472. https://doi.org/10.1080/15623599.2019.1631978
Kasim, N. B. (2008). *IMPROVING MATERIALS MANAGEMENT ON CONSTRUCTION PROJECTS.*
Kazaz, A., Manisali, E., & Ulubeyli, S. (2008). Effect of basic motivational factors on construction workforce productivity in Turkey. Journal of civil engineering and management, 14(2), 95-106.
Kendrick, J. W. (1979). Increasing productivity. Proceedings of the Academy of Political Science, 33(3), 190-202.Cogent Engineering, 3(1), 1145043. https://doi.org/10.1080/23311916.2016.1145043
Khalfan, I., Jamaluddin, Z., & Widyarto, S. (2022). Effect of leadership and quality culture on quality management practices and operational performance of construction companies in Oman. *International Journal of Quality & Reliability Management*, 39(7), 1824–1843.

Kheni, N. A., Dainty, A. R. J., & Gibb, A. (2008). Health and safety management in developing countries: A study of construction SMEs in Ghana. *Construction Management and Economics*, 26(11), 1159–1169. https://doi.org/10.1080/01446190802459916
Kim, J., & Philips, P. (2014). Remuneration and absenteeism on a large construction site. *Construction Management and Economics*, 32(10), 983–999. https://doi.org/10.1080/01446193.2014.944550
Kothari, C. R. (2004). *Research methodology: Methods and techniques. New Age International*
Kumar, S., Duhan, M., & Haleem, A. (2016). Evaluation of factors important to enhance productivity. *Cogent Engineering*, 3(1), 1145043. https://doi.org/10.1080/23311916.2016.1145043
Kyei, P., & Bamfo-Agyei, E. (2021). Determining Labour Productivity for Masonry Works on Construction Sites. African Journal of Applied Research, 7(1), 17-26.
Lenin, P., Krishnaraj, L., Prasad, D. N., & Kumar, V. R. P. (2014). *Analysis of Improper Material Management Affecting Cost in Construction Projects*
Liamputtong, P. (2013). *The Science of Words and the Science of Numbers*.
Lühr, G., Wagner, R., & Radujković, M. (2023). The Influence of Leadership on the Projectification of the Public Construction Sector in Germany. *Buildings,* 13(6), 1506. https://doi.org/10.3390/buildings13061506
Mahamid, I. (2018). *Study of relationship between cost overrun and labour productivity in road construction projects.*
Makulsawatudom, A., Emsley, M., & Sinthawanarong, K. (2004). Critical factors influencing construction productivity in Thailand. The journal of KMITNB, 14(3), 1-6.
Makulsawatudom, A., Emsley, M., & Sinthawanarong, K. (2004). Critical factors influencing construction productivity in Thailand. The journal of KMITNB, 14(3), 1-6.
Manikandan, M., Adhiyaman, M., & Pazhani, D. K. C. (2018.). *A STUDY AND ANALYSIS OF* CONSTRUCTION *EQUIPMENT MANAGEMENT USED IN CONSTRUCTION PROJECTS FOR IMPROVING PRODUCTIVITY*. 05(03
Manoharan, K., Dissanayake, P., Pathirana, C., Deegahawature, D., & Silva, R. (2023). Organisational elements controlling labour efficiency in building construction operations – a construction supervisors' perspective. *International Journal of Industrial Engineering and Operations Management*, 5(1), 54–73.
Manoharan, K., Dissanayake, P., Pathirana, C., Deegahawature, D., & Silva, R. (2024). A case study on the site supervisory attributes in construction labour management, performance assessment and productivity measurement practices. *Journal of Responsible Production and Consumption*, 1(1), 37–61. https://doi.org/10.1108/JRPC-01-2024-0001
Material Management Affecting Cost in Construction Projects.
Mehari, M. Y. (2022.). *Impact of poor communication on project performance among diverse teams*.
Moyo, L. (2021). *In partial fulfilment of Master of Public Health.*
Muiruri, G., & Mulinge, C. (2014). *Health and Safety Management on Construction Project Sites in Kenya.*
Muñoz-La Rivera, F., Mora-Serrano, J., & Oñate, E. (2021). Factors Influencing Safety on Construction Projects (fSCPs): Types and Categories. *International Journal of Environmental Research and Public Health*, 18(20), 10884. https://doi.org/10.3390/ijerph182010884
Nasirzadeh, F., Rostamnezhad, M., Carmichael, D. G., Khosravi, A., & Aisbett, B. (2022). Labour productivity in Australian building construction projects: *A roadmap for improvement.*

International Journal of Construction Management, 22(11), 2079–2088. https://doi.org/10.1080/15623599.2020.1765286
Navon, R., & Berkovich, O. (2006). An automated model for materials management and control. *Construction Management and Economics*, 24(6), 635–646. https://doi.org/10.1080/01446190500435671.
Ngoma, S., Kaliba, C., & Mwanaumo, E. M. (2025). Enhancing Productivity in Construction Trades in Labour-Intensive Construction Projects. *AFRICAN JOURNAL OF APPLIED RESEARCH*, 11(2), 367–391. https://doi.org/10.26437/ajar.v11i2.1041.
Odenigbo, O. G., Odusami, K. T., Okolie, K. C., & Okafor, V. C. (2020). Causes of delayed payment construction project in Nigeria. *European Journal of Engineering and Technology Research*, 5(9), 1049-1053.
Ogundipe, A. A., & Olarewaju, F. O. (2020). Manufacturing Output and Labour Productivity: Evidence from ECOWAS. *Academic Journal of Interdisciplinary Studies*, 9(5), 102. https://doi.org/10.36941/ajis-2020-0089
Ohueri, C. C., Enegbuma, W. I., Wong, N. H., Kuok, K. K., & Kenley, R. (2018). Labour productivity motivation framework for Iskandar Malaysia. *Built Environment Project and Asset Management*, 8(3), 293–304. https://doi.org/10.1108/BEPAM-09-2017-0070
Olanrewaju, A., Tan, S. Y., & Kwan, L. F. (2017). Roles of Communication on Performance of the Construction Sector. *Procedia Engineering*, 196, 763–770.
Olbina, S., Hinze, J., & Arduengo, C. (2011). Drug testing practices in the US construction industry in 2008. *Construction Management and Economics*, 29(10), 1043–1057. https://doi.org/10.1080/01446193.2011.631553
Olomolaiye, P. O., Wahab, K. A., & Price, A. D. F. (1987). Problems influencing craftsmen's productivity in Nigeria. Building and environment, 22(4), 317-323.
Oraegbune, O., Adole, A., & Adeyemo, V. (2016). AN APPRAISAL OF PSYCHOTROPIC DRUGS AND THEIR CONSEQUENCES AMONG THE CONSTRUCTION INDUSTRY WORKERS IN NIGERIA, ADAMAWA STATE CASE STUDY. *Nigerian Journal of Technology*, 36(1), 241–251. https://doi.org/10.4314/njt.v36i1.29
Orr, C. (2005). LEAN LEADERSHIP IN CONSTRUCTION.
Palikhe, S., Kim, S., & Kim, J. J. (2019). Critical success factors and dynamic modeling ofconstruction labour productivity. *International Journal of Civil Engineering*, 17(3), 427-442.
Prasad Nepal, M., & Park, M. (2004). Downtime model development for construction equipment management. Engineering, *ConstructionandArchitecturalManagement*,11(3), 199210.https://doi.org/10.1108/09699980410535804
Quana, B. L. T., Nohb, N. I. F. B. M., Lina, N. J., Ahmadb, Z., Chaia, L. J., Surola, S., ... & Razmand, R. (2022). Effects of Poor Communication in the Construction Industry in Klang Valley, Malaysia. *JKejuruteraan,* 34(5), 837-841.
R. Ranjithapriya, Dr. S. Arulselvan, & Coimbatore institute of technology. (2020). Study on Factors Affecting Equipment Management and its Effect on Productivity in Building Construction. *International Journal of Engineering Research* And, V9(04), IJERTV9IS040176. https://doi.org/10.17577/IJERTV9IS040176
Resnik, D. B. (2020). *What is ethics in research & why is it important*? National Institute of Environmental Health Sciences (NIEHS)

Rogalska, M., & Hejducki, Z. (2022). The possible impact of employee absenteeism risk on a construction project. *Archives of Civil Engineering*, 31–44. https://doi.org/10.24425/ace.2022.143024
Salehi Sichani, M., Lee, S., & Robinson Fayek, A. (2011). Understanding construction workforce absenteeism in industrial construction. *Canadian Journal of Civil Engineering*, 38(8), 849–858. https://doi.org/10.1139/l11-052
Sambasivan, M., & Soon, Y. W. (2007). Causes and effects of delays in Malaysian construction industry. *International Journal of project management*, 25(5), 517-526.
Samee, K., & Pongpeng, J. (2016). Structural equation model for construction equipment management affecting project and corporate performance. *KSCE Journal of Civil Engineering,* 20(5), 1642–1656. https://doi.org/10.1007/s12205-015-0717-1
Sanda, Y. N., A. Anigbogu, N., D. Panshak, R., & Bello, A. (2023). ASSESSING THE IMPACT OF SUBSTANCE ABUSE ON CONSTRUCTION PROJECTS IN JOS, NIGERIA. *Journal of Surveying, Construction & Property*, 14(1), 71–82. https://doi.org/10.22452/jscp.vol14no1.6
Schaufelberger, J. E., & Migliaccio, G. C. (2019). *Construction Equipment Management* (2nd ed.). Routledge. https://doi.org/10.1201/9781351117463
Shelbourn, M., Bouchlaghem, N. M., Anumba, C., & Carrillo, P. (2007). Planning and implementation of effective collaboration in construction projects. *Construction Innovation*, 7(4), 357–377. https://doi.org/10.1108/14714170710780101
Shohet, I. M., & Frydman, S. (2003). Communication Patterns in Construction at Construction Manager Level. *Journal of Construction Engineering and Management*, 129(5), 570–577.
Sila, J. N., & Gakobo, J. (2021). Material management and project performance of construction companies in Nairobi city county, Kenya. *International Academic Journal of Information Sciences and Project Mkasanagement*, 3(6), 368-391.
Singh, A. S., & Masuku, M. B. (2014). Sampling techniques & determination of sample size inapplied statistics research: An overview. *International Journal of economics, commerceand management*, 2(11), 1-22.
Spink, R. M. (1990). Overtime working in the UK.
Srour, F. J., Srour, I., & Lattouf, M. G. (2017). A survey of absenteeism on construction sites. *International Journal of Manpower*, 38(4), 533–547. https://doi.org/10.1108/IJM-08-2015-0135
Stocks, S. J., Turner, S., McNamee, R., Carder, M., Hussey, L., & Agius, R. M. (2011). Occupation and work-related ill-health in UK construction workers. *Occupational Medicine,* 61(6), 407–415. https://doi.org/10.1093/occmed/kqr075
Thomas, H. R., & Napolitan, C. L. (1995). Quantitative effects of construction changes on labor productivity. Journal of construction engineering and management, 121(3), 290-296.
Tsehayae, A. A., & Robinson Fayek, A. (2014). Identification and comparative analysis of key parameters influencing construction labour productivity in building and industrial projects. *Canadian Journal of Civil Engineering*, 41(10), 878–891. https://doi.org/10.1139/cjce-2014-0031
Watson, R. (2015). Quantitative research. *Nursing standard*, 29(31).
Wetherall, H., & Lippell, S. (2016). What is the Impact of Low Employee Motivation Levels Within Organisations? . . August, 2.

Wilson, J. M., & Koehn, E. “Ed.” (2000). Safety Management: Problems Encountered and Recommended Solutions. *Journal of Construction Engineering and Management*, 126(1), 77–79. https://doi.org/10.1061/(ASCE)0733-9364(2000)126:1(77)

Wong, F. W. H., Lam, P. T. I., Chan, E. H. W., & Shen, L. Y. (2007). A study of measures to improve constructability. *International Journal of Quality & Reliability Management*, 24(6), 586–601. https://doi.org/10.1108/02656710710757781

Wong, K., Chan, A. H. S., & Ngan, S. C. (2019). The Effect of Long Working Hours and Overtime on Occupational Health: A Meta-Analysis of Evidence from 1998 to 2018. *International Journal of Environmental Research and Public Health*, 16(12), 2102. https://doi.org/10.3390/ijerph16122102

Xie, H., Zheng, J., Zhang, Y., & Li, H. (2019). Effects of Payment Delays at Two Links in Payment Chains on the Progress of Construction Projects: System Dynamic Modeling and Simulation. *Sustainability*, 11(15), 4115. https://doi.org/10.3390/su11154115

Yuan, J., Yi, W., Miao, M., & Zhang, L. (2018). Evaluating the Impacts of Health, Social Network and Capital on Craft Efficiency and Productivity: A Case Study of Construction Workers in China. *International Journal of Environmental Research and Public Health,* 15(2), 345. https://doi.org/10.3390/ijerph15020345

Zavari, M., & Afshar, M. R. (2023). The role of site manager transformational leadership in the construction project success. *International Journal of Building Pathology and Adaptation*, 41(5), 1067–1085.

Zhang, L., Chen, H., Li, H., Wu, X., & Skibniewski, M. J. (2018). Perceiving interactions and dynamics of safety leadership in construction projects. Safety Science, 106, 66–78.

Contact:

Ebenezer OKANTA and Emmanuel BAMFO-AGYEI, Christopher AMOAH
[1&2]*Department of Construction Technology, Cape Coast Technical University, Ghana.*
okantaebenezer4858@gmail.com
[2]*emmanuel.bamfo-agyei@gmail.com*