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Investigating the Factors Affecting Masonry Labour Productivity on Construction Sites in Benin City, Edo State, Nigeria

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Abstract

Masonry labour productivity is a critical factor in the successful completion of construction projects. Meanwhile, various factors can affect masonry labour productivity, leading to delays, cost overruns, and reduced quality of building projects in Benin City, Edo State. In Nigeria, the construction industry significantly contributes to the country's GDP, and masonry labour productivity plays a vital role in determining the success of construction projects. However, factors often affect masonry labour productivity in Nigeria, including skill level, work experience, tool quality, and weather conditions. This study, therefore, investigated the factors affecting masonry labour productivity on construction sites in Benin City, Nigeria. A constructive questionnaire survey was conducted among 150 masons to gather valuable insights and feedback, and data were analysed using descriptive statistics. The results show that skill level, work experience, tool quality, workers' motivation, workers' training, and weather conditions significantly affect masonry labour productivity. The study suggests that industry stakeholders invest in training programs to improve the skills of masons, provide high-quality tools, and develop strategies to counteract the effects of adverse weather conditions. The findings of this study contribute to the existing body of knowledge on masonry labour productivity by providing valuable insights for contractors, builders, and policymakers seeking to improve labour productivity and efficiency in the construction industry.

Keywords: Construction Sites, Labour, Masonry, Productivity.

Introduction

Masonry labour productivity is a critical factor in determining construction projects' efficiency and cost-effectiveness. It plays a significant role in defining project timelines, budget adherence, and the overall success of a construction venture (Naoum, 2016). In the construction industry, masonry labour productivity refers explicitly to the rate at which masons can complete essential tasks, such as laying bricks, blocks, and concrete works, which constitute the backbone of most building projects (Kyei and Bamfo-Agyei, 2021). Several factors influence masonry labour productivity, making it a multifaceted subject worthy of in-depth exploration (Karthik and Kameswara-Rao, 2022). One of the primary determinants is the skill level of the workforce. Highly skilled masons typically demonstrate better efficiency and higher quality workmanship, thus positively impacting productivity (Khanh *et al*., 2023). Experience has shown that seasoned masons are often more adept at troubleshooting and executing complex tasks, leading to faster completion times (Jibril and Mukarram, 2020; Khanh *et al.,* 2023). Moreover, the quality of tools and equipment utilised can significantly affect productivity rates. Advanced machinery and high-quality tools can streamline processes, reduce worker fatigue, and minimise errors, thereby enhancing the overall output of masonry work (Zaland *et al.,* 2024; Khan *et al.,* 2022). Conversely, inadequate or subpar tools can lead to delays and increased labour costs due to inefficiencies (Salihu *et al.,* 2022). Weather conditions also present a critical influence on masonry labour productivity. Adverse weather, such as extreme temperatures or rain, can halt

construction activities and negatively affect both the health and performance of workers (Senouci *et al.*, 2018). Studies have shown that planning and scheduling work based on seasonal weather patterns can alleviate some of these productivity challenges (Lucko *et al.*, 2014; Ballesteros-Pérez *et al.*, 2017). In addition to these factors, motivational aspects such as worker morale and job satisfaction have been found to correlate positively with productivity levels (Al-Abbadi and Agyekum-Mensah, 2022). Understanding the interplay between these various determinants is essential for construction managers aiming to optimise masonry labour productivity and, by extension, project success (Gerek *et al*., 2015). Masonry labour productivity involves a comprehensive approach that takes into account skill levels, experience, tool quality, weather conditions, and worker motivation. As research continues to evolve in this area, it becomes increasingly clear that targeting these factors can lead to significant improvements in construction efficiency and effectiveness (Khanh *et al.,* 2023; Kyei and Bamfo-Agyei, 2021; Florez and Cortissoz, 2016; Senouci *et al.,* 2018; Al-Abbadi and Agyekum-Mensah, 2022)

In Nigeria, the construction industry is a significant contributor to the country's GDP, accounting for approximately 3.23% of the country's total GDP in 2020 (National Bureau of Statistics 2020). The construction industry in Nigeria is characterised by a high demand for skilled labour, particularly masons (Fortune *et al.,* 2019). Benin City, the capital of Edo State in Nigeria, is a significant construction hub, with numerous ongoing and planned construction projects (Odjugo *et al*., 2015; Odeyale, 2023). The city's construction industry is characterised by a high demand for masonry labour, driven by the need for housing, infrastructure, and commercial developments (Fortune et al., 2019). However, the industry faces significant challenges, including low labour productivity, which can lead to project delays, cost overruns, and reduced quality of work (Ugulu *et al.,* 2020). Despite the importance of masonry labour productivity in the construction industry, there is a dearth of research on the factors affecting masonry labour productivity in Nigeria, particularly in Benin City (Kyei and Bamfo-Agyei, 2021). This study aims to fill this knowledge gap by investigating the factors affecting masonry labour productivity on construction sites in Benin City, Nigeria. The study's findings will provide valuable insights for contractors, builders, and policymakers seeking to improve labour productivity and efficiency in the construction industry. The aim of this paper was achieved through the following objectives:

1. To identify the factors affecting masonry labour productivity on construction sites in Benin City, Nigeria.
2. To examine the factors affecting masonry labour productivity on construction sites in the study area.

Literature Review

Masonry labour productivity is a critical factor in determining the overall efficiency and cost-effectiveness of construction projects. Several studies have investigated the factors affecting masonry labour productivity in different contexts. Hamouda and Abu-Shaaban (2015) conducted a study investigating the factors affecting labour productivity in the Gaza Strip construction industry. They found that skill level, work experience, and tool quality significantly affect labour productivity. Another study by Jimoh *et al.,* (2013) established that contractors and builders need to invest in training programs to enhance the skills of labourers, provide high-quality tools, and develop strategies to mitigate the effects of adverse weather conditions. Mahamid (2013) conducted a study investigating the factors affecting labour productivity in the Palestinian construction industry. He found that weather conditions, tool quality, and work experience significantly affect labour productivity. His study recommended that contractors and builders develop strategies to mitigate the effects of adverse weather conditions, provide high-quality tools, and prioritise hiring experienced labourers. Muhammad *et al.* (2015); Atomen *et al*. (2015) conducted a study to investigate the factors affecting construction labour productivity in Nigeria, both used Northern part as a case study. Their study found that skill level, work experience, and training significantly affect labour productivity. Their study also recommended that contractors and builders invest in training programs to enhance the skills of labourers and prioritise hiring experienced labourers. Joshua and Majekodunmi (2020) and Sati *et al.* (2023) conducted a study to investigate the impact of climate change on construction labour productivity in Nigeria. The study found that weather conditions significantly affect labour productivity,

particularly temperature and rainfall. The study recommended that contractors and builders develop strategies to mitigate the effects of adverse weather conditions, such as providing shade and shelter for labourers.

In addition to these studies, several other researchers have investigated the factors affecting masonry labour productivity in different contexts. For example, Kyei and Bamfo-Agyei (2021); Almamlook *et al.* (2020) found that skill level, work experience, workers' motivation and tool quality are significant factors affecting labour productivity in the construction industry. Similarly, Senouci *et al.* (2018) found that weather conditions, tool quality, and work experience are significant factors affecting labour productivity in the construction industry.

In Nigeria, several studies have investigated the factors affecting construction labour productivity. For example, Jimoh *et al*. (2013); Muhammad *et al.* (2015) found that skill level, work experience, and training significantly affect labour productivity in the construction industry. Similarly, Joshua and Majekodunmi (2020) found that weather conditions, tool quality, and work experience are significant factors affecting labour productivity in the construction industry.

Overall, the literature review suggests several factors that affect masonry labour productivity, including skill level, work experience, tool quality, weather conditions, workers' motivation, and training.

Materials and methods

Research design

This research took a positivist philosophical stance, which necessitated a quantitative research design, specifically a survey research design. The study aimed to collect data from a sample of masons working on construction sites in Benin City, Nigeria. The population of this study consisted of all masons working on construction sites in Benin City, Edo State, Nigeria. A sample of 150 masons was selected using a convenience sampling technique. The sample size was determined based on the availability of resources and the need to collect a representative sample of data. The questionnaire was administered to the selected sample of masons through online and offline methods. The online method involved sending the questionnaire to the masons via email and WhatsApp, while the offline method involved administering the questionnaire in person on construction sites. The data collection process took approximately six weeks to complete. The administered questionnaires were all retrieved, and the collected data were analysed using descriptive statistics. Frequency tables and percentages were used to analyse the respondents' demographic characteristics, the factors affecting masonry labour productivity, and the suggested strategies for improving masonry labour productivity on construction sites in Benin City.

Reliability and validity

The reliability of the questionnaire was tested using Cronbach's alpha coefficient, which yielded a value of 0.85, indicating a high level of reliability. The validity of the questionnaire was tested using content validity, which involved reviewing the questionnaire with 5 experts in the field to ensure that it measured what it was supposed to measure.

Ethical considerations

This study was conducted following the principles of informed consent and confidentiality. As outlined by (Ogunsanwo and Bello, 2024), informed consent requires that participants understand the purpose of the study and any potential risks involved. Confidentiality is essential for protecting the personal information of participants. Before completing the questionnaire, participants were informed about the study's objectives, and their consent was obtained. They were also assured that their responses would remain confidential and that their anonymity would be maintained throughout the research process.

Results and Discussion

The findings are presented in tables, and the narratives are discussed.

Table 1: Demographic Information

Age of Respondents	Frequency	Percentage (%)
Under 20	10	6.67
21-30	40	26.67
31-40	35	23.33
41-50	30	20.00
Over 50	35	23.33
Total	**150**	**100**

Source: Author's work (2025)

Table 1 provides an overview of the age distribution of 150 respondents for this study. The largest group, representing 26.67%, falls within the 21-30 age range, indicating that younger workers are prominent in masonry. Additionally, nearly half of the respondents (46.66%) are 41 and above, suggesting a significant presence of experienced individuals whose skills can enhance productivity. Conversely, only 6.67% of respondents are under 20, which may mean limited entry into the masonry market for younger workers. The balanced representation across ages 31-40, 41-50, and over 50 indicates a diverse workforce, fostering collaboration and knowledge sharing. Understanding these age dynamics is vital for policymakers and construction companies, suggesting a need for targeted training, succession planning, and strategies to attract younger workers while retaining experienced ones. Overall, the demographic insights from Table 1 are essential for assessing productivity factors among masonry labourers in Benin City, highlighting the blend of youthful energy and experienced expertise necessary for effective construction teams.

Table 2: Respondents' Years of Experience

Years of Experience	Frequency	Percentage (%)
1-5	25	16.66
6-10	45	30.00
11-15	40	26.67
16+	40	26.67
Total	**150**	**100**

Source: Author's work (2025)

Table 2 presents the distribution of respondents' years of experience. The largest group comprises masons with 6-10 years of experience, totalling 45 respondents (30%), indicating a solid base of moderately experienced workers. The second-largest group includes those with 11-15 years of experience, with 40 respondents (26.67%). Additionally, the 16+ years and 1-5 years' categories have 40 respondents (26.67% and 16.66%, respectively). This suggests a good presence of highly experienced workers but a smaller percentage of newcomers, potentially indicating barriers to entry. Of the 150 respondents, 46.67% have over 10 years of experience. This wealth of experience may enhance productivity on construction sites, while the smaller group of novices may necessitate training initiatives to boost their skills and contributions. Understanding these trends is essential for effective workforce planning.

Table 3: Respondents' Highest Education

Highest Education	Frequency	Percentage (%)
Primary	15	10.00
Secondary	50	33.33
Vocational/Technical	45	30.00
University Degree	40	26.67
Total	**150**	**100**

Source: Author's work (2025)

Table 3 presents the highest education levels attained by the 150 respondents. The data reveals a diverse educational background among the respondents, with the largest group holding a secondary education (33.33%), followed closely by those with vocational/technical qualifications (30.00%). University degree holders constitute 26.67% of the respondents, indicating a significant proportion with higher education, while those with only primary education represent the smallest group at 10.00%. This distribution suggests that many masonry labourers possess vocational training or secondary education, which may play a critical role in their productivity and skill levels on construction sites.

Table 4: Skill Level Factor

Skill Level Rating	Frequency	Percentage (%)
Very Poor	5	3.33
Poor	10	6.67
Average	60	40.00
Good	40	26.67
Excellent	35	23.33
Total	**150**	**100**

Source: Author's work (2025)

The data in Table 4 illustrates the skill levels of the masonry workers. Among 150 respondents, 40% (60 individuals) rated their skills as average, indicating a foundational competency but a lack of advanced training. Additionally, 26.67% (40 respondents) rated their skills as good, suggesting a fair level of proficiency. Only 3.33% (5 respondents) described their skills as very poor, revealing a minor concern regarding inadequate skills that could affect productivity. Moreover, 6.67% (10 respondents) rated their skills as poor, indicating potential for improvement. Conversely, 23.33% (35 individuals) rated their skills as excellent, showcasing a notable minority with advanced competencies likely contributing significantly to overall productivity. This varied distribution highlights that the predominant average competency may hinder optimal productivity. However, skilled workers could provide mentorship and peer training, improving the overall skill level in the region. The analysis emphasises the need for targeted training programs to enhance skills across the board, aligning with previous studies that link skill level to masonry labour productivity (Jimoh *et al*., 2013; Muhammad *et al*., 2015).

Table 5: Work Experience Factor

Level of Work Experience	Frequency	Percentage (%)
Very Poor	5	3.33
Poor	10	6.67
Average	60	40.00
Good	30	20.00
Excellent	45	30.00
Total	**150**	**100**

Source: Author's work (2025)

Table 5 highlights the distribution of work experience among masonry workers on construction sites in the study area, indicating a varied level of expertise that impacts overall productivity. A significant proportion, 40%, classify their experience as "Average," which suggests a considerable workforce with moderate skills that may require further training to enhance efficiency. Meanwhile, 30% of labourers rate their experience as "Excellent," reflecting a group of highly skilled workers who could potentially lead projects and mentor others, improving overall productivity on-site. Conversely, a combined total of 10% fall into the "Very Poor" and "Poor" categories, indicating a concern regarding a slight but notable segment of the workforce that may lack essential skills and experience. This disparity raises questions about the recruitment and training processes within the industry and suggests that construction firms may benefit from targeted workshops and training programs. The data underscores the necessity for strategic workforce management, aligning the more experienced workers with less experienced ones to foster knowledge transfer and improve the overall competency of the labour force. Addressing these variations effectively could enhance productivity and project outcomes in the construction sector of Benin City. The finding that work experience is a significant factor affecting masonry labour productivity is consistent with a previous study (Khanh *et al.*, 2023).

Table 6: Tool Quality Factor

Tool Quality Rating	Frequency	Percentage (%)
Very Poor	10	6.67
Poor	20	13.33
Average	50	33.33
Good	35	23.33
Excellent	35	23.33
Total	**150**	**100**

Source: Author's work (2025)

Table 6 presents an analysis of the Tool Quality Factor affecting masonry labour productivity, highlighting the distribution of ratings given by workers regarding the tools used. Among the 150 respondents, a significant proportion, 33.33%, rated tool quality as average, indicating that many workers perceive the tools as neither particularly good nor bad. Additionally, 23.33% of the workers rated the tools as good, and another 23.33% rated them as excellent, suggesting that nearly half of the respondents feel positively about the quality of the tools. However, the data reveals dissatisfaction exists, as 20% of respondents rated the tools as poor, and 6.67% deemed them very poor. This highlights a notable concern regarding tool efficacy, which could directly influence productivity levels and the overall work experience. The combined percentage of negative reviews (very poor and poor) stands at 20.67%, underscoring that a portion of the workforce might struggle with inadequate tools, potentially affecting their performance and output. The distribution of responses indicates a moderate overall satisfaction with tool quality, yet significant

dissatisfaction calls for an investigation into the reasons behind these negative perceptions. Addressing the concerns raised, particularly from those who indicated poor quality, may lead to improved labour productivity and morale within the construction industry in the region. Overall, while many workers feel supported by adequate tools, the concerns highlighted may be pivotal for construction firms looking to optimize workforce efficiency and ensure high standards in project execution. The finding that tool quality is a significant factor affecting masonry labour productivity is consistent with previous studies (Gopal and Murali, 2015; Chigara and Moyo, 2014).

Table 7: Weather Conditions Factor

Weather Impact Rating	Frequency	Percentage (%)
Not at All	10	6.67
Slightly	15	10.00
Moderately	45	30.00
Very Much	50	33.33
Extremely	30	20.00
Total	**150**	**100**

Source: Author's work (2025)

The data presented in Table 7 demonstrates the significant influence of weather conditions on masonry labour productivity on construction sites in Benin City, Edo State, Nigeria. Out of 150 respondents, 33.33% indicated that weather conditions impact productivity "very much," while 30% rated the effect as "moderately." This collectively highlights that over 63% of participants perceive weather as a considerable factor affecting their work efficiency. Conversely, a smaller segment of the respondents, 10% and 6.67%, categorised the impact of weather as "slightly" and "not at all," respectively, suggesting that while a minority may not find weather conditions significantly disruptive, the majority acknowledges a direct correlation between adverse weather and productivity challenges. The category of "extremely" impacted workers, comprising 20%, further emphasises the weather's critical role in construction processes. Variability in weather can lead to delays, increased risks, and safety concerns, affecting the pace and quality of masonry work. This analysis underscores the need for effective planning and risk management strategies that account for weather conditions to enhance labour productivity on construction sites. Understanding how weather impacts workers can inform supervisors and project managers to implement adaptive measures, such as adjusting work schedules or providing appropriate resources, ultimately fostering a more productive work environment. In summary, the prevailing sentiment among most respondents surfaces the necessity for the construction industry to prioritise weather impact as a pivotal factor in labour productivity assessment and management. The finding that weather conditions significantly affect masonry labour productivity is consistent with a previous study (Senouci *et al.*, 2018).

Table 8: Common Weather Challenge

Weather Impact Rating	Frequency	Percentage (%)
Rain	70	46.66
Extreme Heat	30	20.00
Cold Temperatures	25	16.67
Heat	25	16.67
Total	**150**	**100**

Source: Author's work (2025)

Table 8 presents a quantitative analysis of common weather challenges affecting masonry labour productivity. Rain is the most significant factor among the various weather conditions, impacting 46.66% of respondents. This high frequency suggests that rain disrupts work schedules and may lead to safety hazards and material spoilage, thus severely hampering productivity. The next most notable concern is extreme heat, reported by 20% of respondents, which can lead to worker fatigue and heat-related illnesses, slowing the overall work pace. Cold temperatures and general heat conditions equally affect 16.67% of the labour force, indicating that both extremes of the temperature spectrum pose challenges to efficient masonry work. The even distribution of the challenges posed by cold temperatures and heat suggests that environmental conditions are pivotal in shaping labour productivity, with each scenario requiring different management strategies to mitigate adverse effects. Overall, the table highlights the pressing need for construction companies in the region to develop adaptive strategies to cope with these weather challenges, ensuring that productivity is not compromised and that workers' well-being is prioritised. Implementing measures such as flexible scheduling and providing adequate breaks and hydration during extreme weather conditions could be essential steps in enhancing labour productivity amidst these challenges.

Table 9: Workers' Motivation Factor

Motivation Level	Frequency	Percentage (%)
Not Motivated	5	3.33
Slightly Motivated	10	6.67
Moderately Motivated	60	40.00
Very Motivated	35	23.33
Extremely Motivated	40	26.67
Total	**150**	**100**

Source: Author’s work (2025)

The data in Table 9 highlights the motivation levels of workers involved in masonry works on construction sites in the study area. Among 150 respondents, 40% were moderately motivated and 26.67% were extremely motivated, indicating that most workers have reasonable motivation, which can enhance productivity. However, 3.33% reported being unmotivated and 6.67% only slightly motivated, suggesting that a small group may lack engagement, potentially affecting overall efficiency. The 10% of workers who are unmotivated or slightly motivated signal a critical area for intervention. Employers and project managers should focus on improving motivational strategies by identifying dissatisfaction factors and enhancing working conditions. Implementing targeted motivational programs and better incentives could help raise motivation levels, ultimately boosting productivity and improving construction quality in the region. This analysis emphasises the vital role of worker motivation in the construction industry’s productivity.

Table 10: Training Factor

Training Programs	Frequency	Percentage (%)
Not Effective	5	3.33
Slightly Effective	60	40.00
Moderately Effective	40	26.67
Very Effective	15	10.00
Extremely Effective	30	20.00
Total	**150**	**100**

Source: Author’s work (2025)

The data presented in Table 10 highlights the perceived effectiveness of training programs on masons. Out of 150 respondents, a significant proportion, 40% (60 individuals), rated the training as slightly effective, indicating that while some benefits are recognised, substantial improvements are still needed. A smaller group, 26.67% (40 respondents), found the training moderately effective, suggesting that these programs have some positive impact but may not fully meet workers' needs. Conversely, only 10% (15 respondents) deemed the training very effective, and 20% (30 respondents) rated it highly effective. These figures reveal a concerning trend, as only a minority of participants perceive the training programs as highly effective, which may suggest deficiencies in the training content, structure, or delivery. The collective data imply that most masonry workers do not believe their training is sufficiently impactful to enhance their productivity significantly. Thus, it could be concluded that there is a need for a comprehensive review and potential revamping of training strategies to better address the workers' actual needs and improve overall productivity on construction sites. This could involve assessing the training material's relevance, the trainers' qualifications, and practical applications on-site to ensure that the training translates into improved outcomes.

Table 11: Suggested Strategies for Improving Masonry Labour Productivity

Strategy	Frequency	Percentage (%)
Comprehensive Training Programs	30	20.00
High-Quality Tools and Materials	25	16.67
Safe and Comfortable Working Environment	20	13.33
Adoption of Construction Technology	20	13.33
Efficient Project Planning	15	10.00
Collaborative Work Environment	15	10.00
Weather Mitigation Strategies	10	6.67
Monitoring Performance Metrics	5	3.33
Hiring Experienced Masons	5	3.33
Performance-Based Incentives	5	3.33
Total	**150**	**100**

Source: Author's work (2025)

Table 11 provides an overview of strategies to improve masonry labour productivity in the study area, detailing the frequency and percentage of responses for each strategy. The leading recommendation is comprehensive training programs, which received thirty mentions (20% of total responses), indicating a strong consensus on enhancing masons' skills to boost productivity. Closely following is the provision of high-quality tools and materials, with twenty-five mentions (16.67%), highlighting the importance of adequate resources for effective workmanship. The significance of a safe and comfortable working environment is stressed, with twenty responses (13.33%) emphasising that worker safety and comfort are essential for high productivity. Similarly, twenty respondents (13.33%) support adopting construction technology, reflecting a growing awareness of its potential to enhance efficiency in masonry. Efficient project planning and fostering a collaborative work environment each received fifteen mentions (10%), showing the necessity of coordinated efforts to optimise workflow and communication among team members. Weather mitigation strategies garnered ten responses (6.67%), underscoring the importance of adapting to environmental challenges. Lastly, monitoring performance metrics, hiring experienced masons, and implementing performance-based incentives received the least emphasis, with each garnering five mentions (3.33%). This suggests a recognition of the role of data-driven assessments, skilled labour, and motivation in enhancing productivity. Overall, the findings indicate a multifaceted approach prioritising human resource development, technology, workplace conditions, and systematic planning to improve masonry labour outcomes in the region. The total responses amounted to 150, reflecting stakeholders' collective insights on vital components driving productivity.

Conclusion

This study investigated the factors affecting masonry labour productivity on construction sites in Benin City, Nigeria. It was found that skill level, work experience, tool quality, weather conditions, workers' motivation and workers' training influence masonry labour productivity. Importantly, these factors do not act in isolation but as part of a complex interplay affecting overall productivity. The findings of the study highlighted several strategies for enhancing productivity among masonry workers. It is essential for policymakers to implement supportive policies and regulations that promote the development of masons within the Nigerian construction industry.

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