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Reframing Informal Construction Labour as Socio-Economic Determinants of Regional Development in Southeastern Nigeria

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Abstract

Informal construction artisans sustain housing production and urban livelihoods in Nigeria, but their socio-economic roles remain insufficiently documented. This study examines associations between artisans' characteristics, work practices and indicators of labour valuation, productivity and economic participation in Owerri, Awka and Umuahia, southeastern Nigeria. A quantitative cross-sectional survey administered 425 structured questionnaires; 384 usable responses (90.4%) were analysed using descriptive statistics, Spearman's rank correlation, Kendall's tau-b and Pearson's chi-square tests. Educational status was positively associated with cost of engagement ($\rho = .207$, $p < .001$), while tools and techniques were associated with reported output ($\tau b = .302$, $p < .001$). Task competence was associated with hiring frequency, $\chi^2(6) = 18.361$, $p = .005$. Skill level was not significantly associated with reliance on construction income ($\tau b = .085$, $p = .079$), and remuneration timing was not associated with economic exchange timing, $\chi^2(1) = 2.509$, $p = .113$. These findings suggest that informal artisans are embedded in local construction markets, although the cross-sectional survey cannot establish causal or region-wide economic effects. Policy should prioritise skills recognition, access to tools, occupational safety and inclusive social protection.

Keywords: Construction Artisans, Human Capital, Informal Labour, Regional Development, Southeastern Nigeria

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INTRODUCTION

Informal construction labour has become a prominent but incompletely measured component of urban and regional development in the Global South. Artisans are historically associated with skilled manual production, craft knowledge and practical competence. However, in contemporary urban economies, their relevance extends beyond craft preservation to the production of housing, infrastructure and everyday livelihoods (De Munck, 2019; Kroezen et al., 2021; Testolini et al., 2023). In the building construction sector, masons, carpenters, tilers, plumbers, electricians and iron benders translate land, materials and household investment into habitable structures, roads, small infrastructure and repair systems that sustain urban life (Fei et al., 2021; UN-Habitat, 2020). Their work is particularly significant in developing economies where formal employment cannot absorb the growing labour force and where informal enterprise provides income, skills circulation and local economic exchange (International Labour Organization [ILO], 2018, 2020; World Bank, 2021). In southeastern Nigeria, housing and construction demand provides employment opportunities for artisans in cities such as Owerri, Awka and Umuahia. Yet how their capabilities and labour-market experiences relate to economic participation remains underexamined.

Despite this centrality, informal construction artisans remain institutionally marginal. The construction industry is commonly divided between formal actors, such as registered professionals regulated through licensing, taxation and professional codes, and informal actors whose work is generally unregistered, weakly protected and poorly captured by official development statistics (ILO, 2018; World Bank, 2021; OECD & International Labour Organization, 2019). This institutional invisibility creates a major development problem. Artisans often operate without fixed salaries, social protection, enforceable work rights or stable access to training and finance, making their incomes difficult to measure and their contribution difficult to tax or integrate into public policy (Medina et al., 2017; OECD & International Labour Organization, 2019; World Bank, 2021). At the same time, low educational attainment, reliance on traditional tools, informal recruitment networks and uneven access to modern techniques affect productivity, income, quality control and occupational safety (ILO, 2016; Wijayaningtyas et al., 2022). These vulnerabilities have encouraged a narrow policy and scholarly tendency to view informal artisans mainly through the lens of risk, regulatory failure, poor artistry and building collapse (Afolabi et al., 2018; Ayeniyo et al., 2020). While such concerns are legitimate, they present only one side of the informal construction economy.

The other side is developmental. Artisans in building construction contribute to employment, household survival, skills reproduction, infrastructure delivery and local circulation of income. In Nigeria, where access to decent formal employment remains limited, construction trades provide a practical route into work for many urban residents and support households through daily, weekly or contract-based earnings (ILO, 2018; Mahadea & Zogli, 2018; Medina et al., 2017). The artisan economy also generates backward and forward linkages through the purchase of materials, the engagement of apprentices, the payment for transport, food, and tools, and participation in neighbourhood markets. Such linkages suggest that artisans are not merely residual labourers at the lower end of the economy; rather, they are embedded economic actors whose incomes and work practices shape regional development outcomes. This point is consistent with recent scholarship, which argues that the construction workforce contributes to

the modelling, expansion and sustainability of urban centres (Fei et al., 2021; Al Asali, 2020; Jankova et al., 2020).

Previous studies have examined important aspects of informality, construction labour and artisan livelihoods. Some have focused on poverty, employment and the gig economy in Nigeria and sub-Saharan Africa (ILO, 2018; Medina et al., 2017; World Bank, 2021). Others have reviewed policy frameworks, social protection and the exclusion of informal workers from basic labour rights (ILO, 2016; OECD & International Labour Organization, 2019; World Bank, 2021). A related body of work has interrogated the artisan–professional gap, skills mismatch and the impact of technical capacity on construction project performance (Afolabi et al., 2018; Ayeniyo et al., 2020). In addition, studies of informal economic actors in Nigeria have recognised their relevance to urban economic development, although much of this evidence has concentrated on sectors such as automobile repair rather than building construction (Medina et al., 2017; World Bank, 2021). Consequently, the specific relationship between the socio-economic attributes of building construction artisans and measurable development outcomes in Southeastern Nigeria remains insufficiently examined. Recent Nigerian research has documented skills-training barriers in Edo State (Idowu et al., 2024), monetary shocks affecting informal artisans in Lagos (Ebekozien et al., 2024), and intersecting income, tool and institutional constraints among artisans in Enugu (Ozigbo et al., 2025). These studies reinforce the importance of the sector but do not directly test the same set of artisan-level associations across Owerri, Awka and Umuahia.

This paper responds to that gap by reframing informal construction labour as a socio-economic determinant of regional development. It does so through human capital theory, structuralist perspectives on informality and the concept of economic embeddedness (Granovetter, 1985). Human capital theory focuses on how education, skill acquisition, experience, task competence and tool use influence productivity, employability and income (Tunji-Olayeni et al., 2018; Afolabi et al., 2018). Applied to construction artisans, this perspective suggests that artisans with better training, broader task competence and improved technical resources are more likely to attract work, earn higher income and deliver better construction outputs. However, human capital theory alone is insufficient, as it may overstate individual capacity while underestimating the structural conditions that shape artisans' livelihoods. Structuralist perspectives, therefore, complement it by explaining informality as part of the wider organisation of urban economies rather than as an isolated or temporary deviation from formality (ILO, 2018; OECD & International Labour Organization, 2019; Chipangura, 2019). From this view, artisans are connected to labour surplus, weak regulation, housing demand, household expenditure, local markets and state incapacity. Their marginality is therefore produced structurally, but so too is their developmental relevance.

The study focuses on informal construction artisans operating in selected urban centres of Southeastern Nigeria, with attention to masons, tilers, carpenters, plumbers, iron benders and electricians. It examines how their socio-economic characteristics, educational backgrounds, income patterns and economic participation translate into regional development outcomes. Specifically, the paper interrogates the extent to which limited human capital constrains income potential, and the degree to which artisan income supports household expenditure and local economic engagement. By using survey evidence and statistical analysis, the study moves the discussion beyond descriptive claims about artisans' importance towards an empirical account of their measurable contribution to regional development.

The significance of this reframing is both scholarly and policy-oriented. Conceptually, the paper challenges the residual view of informal construction artisans and advances an embeddedness perspective in which artisan labour is recognised as part of the functional architecture of regional economies. Empirically, it contributes evidence from Southeastern Nigeria, a region where informal construction labour is highly visible but often under-counted and under-supported. From a policy perspective, the paper argues for targeted human capital investment, improved vocational training, tool-upgrading support, social protection, cooperative registration and institutional recognition. Such interventions would not merely formalise artisans for taxation; they would enhance productivity, safety, inclusion and sustainable regional development. In this sense, informal construction artisans should be understood not as marginal actors waiting to disappear but as development agents whose capacities can be strengthened to drive broader urban and regional transformation. The remainder of this article is organised as follows. Section 2 synthesises relevant scholarship and develops the conceptual argument. Section 3 describes the research design, sampling, instruments and analysis. Section 4 presents and discusses the results, while Section 5 concludes with policy implications and avenues for future research.

LITERATURE REVIEW

This section reviews literature on informal construction artisans, socio-economic characteristics, human capital, structural informality and regional development. The argument is developed cumulatively: artisans are first situated as productive actors in the construction economy; their socio-economic and human-capital conditions are then examined; the structural constraints of informality are explained; and the review then identifies what existing evidence does not establish about artisan-level relationships across the selected cities. The central position advanced is that informal construction artisans should not be treated merely as residual labourers, but as embedded contributors to housing production, employment, household welfare and local economic circulation in Southeastern Nigeria.

Informal Construction Artisans as Productive Actors in Regional Development

The first point emerging from the literature is that informal construction artisans occupy a central position in the production of urban space, even where their contribution is not fully recognised in formal development discourse (Fei et al., 2021). Artisans are skilled manual practitioners whose knowledge is expressed through craft competence, site experience and practical problem-solving (Afolabi et al., 2018; Ranganathan, 2018). In the building industry, this includes masons, carpenters, tilers, plumbers, electricians and iron benders who convert materials, labour and client investment into habitable buildings and supporting infrastructure. This evidence indicates that artisans are not peripheral to construction; they are part of the labour system through which urban growth becomes physically visible. Accordingly, regional development in Southeastern Nigeria must be analysed through the informal labour that makes everyday housing and construction activity possible.

Recent literature also shows that artisanal work has technical, socio-cultural and economic significance. De Munck (2019) traces artisanal production through traditions of apprenticeship and craft specialisation, while Kroezen et al. (2021) show that contemporary artisans combine inherited skills with changing market demands. Built-environment studies further associate craftsmanship with place identity, adaptive construction and local knowledge (Mukherjee & Ghosh, 2020; Speecke, 2022). These studies explain why artisans are more than casual labourers: they carry practical knowledge that allows construction to respond to local materials,

household budgets and site conditions. However, research on the cultural meaning of craft does not itself quantify construction artisans' work frequency, labour valuation or economic participation in southeastern Nigerian cities.

The development value of artisans is also visible through income generation and local economic circulation. Studies of informal employment show that the informal economy remains a major source of work where formal labour markets cannot absorb the active population (ILO, 2018; World Bank, 2021). Construction artisans earn income through daily wages, contract jobs, subcontracting, repairs and small-scale building projects, and these earnings circulate through food purchases, transport, rent, school fees, tools, materials and household welfare. These transactions suggest plausible local economic linkages, but household expenditure and regional multiplier effects require direct measurement before their magnitude can be established. Nigerian household-enterprise evidence indicates that education, location and infrastructure may differentiate informal-sector returns (Nwaka & Emeagwali, 2024). These connections are illustrated in Figure 1.

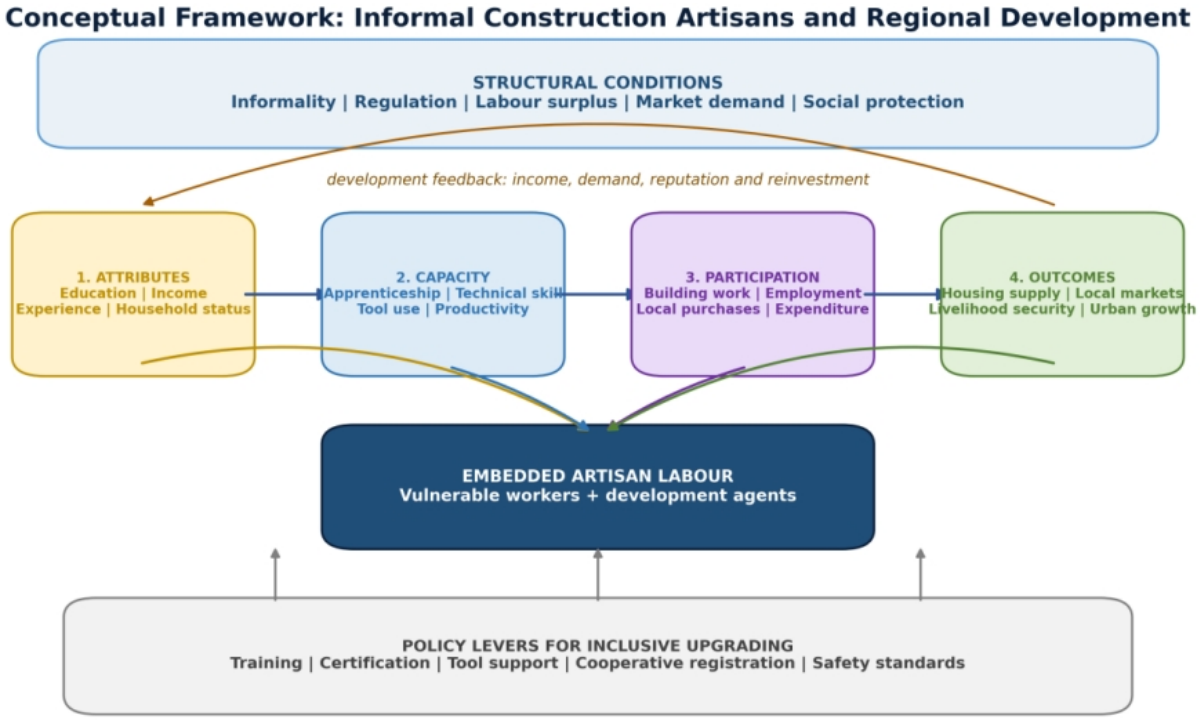


Figure 1: Conceptual Framework for Artisan Labour and Regional Development

Note: *Author-generated diagram (2026). The arrows represent theorised relationships, not estimated causal effects.*

Socio-Economic Characteristics, Human Capital and Artisans Productivity

Artisans' contribution to development is shaped by their socio-economic characteristics. Education, income, apprenticeship history, trade specialisation, work experience, household responsibility and access to tools affect how artisans participate in the construction economy. Tunji-Olayeni et al. (2018) and Salvatori and Manfredi (2019) show that workers' socio-economic positions influence labour market access, income security and productivity. In construction, these factors determine how often artisans are hired, how much they charge, the quality of work they deliver and the extent to which their earnings support household and local

economic needs. Here, socio-economic characteristics are not background details; they are explanatory variables in understanding artisan productivity and regional development.

Human capital theory provides a useful evidence base for this argument because it holds that education, training, skills and experience improve productivity and earning potential (Tunji-Olayeni et al., 2018; Afolabi et al., 2018). For construction artisans, human capital is expressed through the ability to interpret instructions, measure accurately, use tools safely, understand materials, solve site problems and complete tasks to acceptable standards. Apprenticeship is particularly important because many artisans acquire competence through practical learning rather than formal technical education (Decker, 2019; Ayeniyo et al., 2020). Thus, artisan skills may be tacit and practice-based, but they remain economically valuable and influence income potential.

Nevertheless, limited human capital can restrict productivity and income. Construction studies identify skill gaps, weak training systems and poor certification as factors that undermine project quality, safety and efficiency (Afolabi et al., 2018; Ayeniyo et al., 2020). Many informal artisans also have limited access to modern tools, updated techniques, digital technologies and occupational health and safety training (Agenbag & Amoah, 2021; Wijayaningtyas et al., 2022). This means that productivity does not depend on skill alone; it also depends on equipment, supervision, certification and continuous training. In Edo State, Idowu et al. (2024) identify shortcomings in funding and training methods, while Ojo et al. (2025) document substantial occupational injury burdens among informal bricklayers and carpenters in Osun State. Together, these findings indicate that training, equipment and worksite protection are complementary rather than interchangeable interventions.

Structural Conditions of Informality in the Construction Economy

The performance and vulnerability of construction artisans cannot be explained by individual skills alone. Structuralist perspectives argue that economic actors must be understood within the wider systems that shape their opportunities, constraints and behaviour (ILO, 2018; OECD & International Labour Organization, 2019; Chipangura, 2019). In the informal construction economy, artisans' work is shaped by labour surplus, urban housing demand, weak regulation, affordability constraints, informal recruitment networks and limited social protection. This evidence explains why artisans remain informal despite their importance to housing production and urban growth. Accordingly, informality is treated not as personal failure, but as a structural condition of regional development.

Studies of informal labour show that informality persists because formal employment systems, regulatory institutions and welfare arrangements are often unable to include all workers. ILO (2018), OECD and International Labour Organization (2019), and World Bank (2021) argue that informal workers provide essential economic functions while remaining outside many of the protections associated with decent work. In construction, artisans are commonly hired through referrals, neighbourhood networks, project-based contracts and short-term arrangements. These systems provide access to work, but they also limit documentation, taxation, certification, insurance and legal protection. The explanation is that the same informality that enables flexible and affordable construction also produces insecurity and institutional invisibility.

Structural informality also affects tools, techniques and technological upgrading. Global construction is being transformed by modern equipment, prefabrication, digital planning, Building Information Modelling and improved safety standards (Puolitaival et al., 2019; Low

et al., 2021). However, many informal artisans continue to depend on traditional tools, personal experience and limited capital. Al Asali (2020) and Squassina (2022) show that traditional methods remain useful in context-sensitive construction, but Agenbag and Amoah (2021) caution that technological upgrading can displace manual workers if it is not inclusive. Thus, inclusive upgrading should strengthen artisan productivity rather than erase their livelihood function. Figure 2 summarises the literature gap identified in this review.

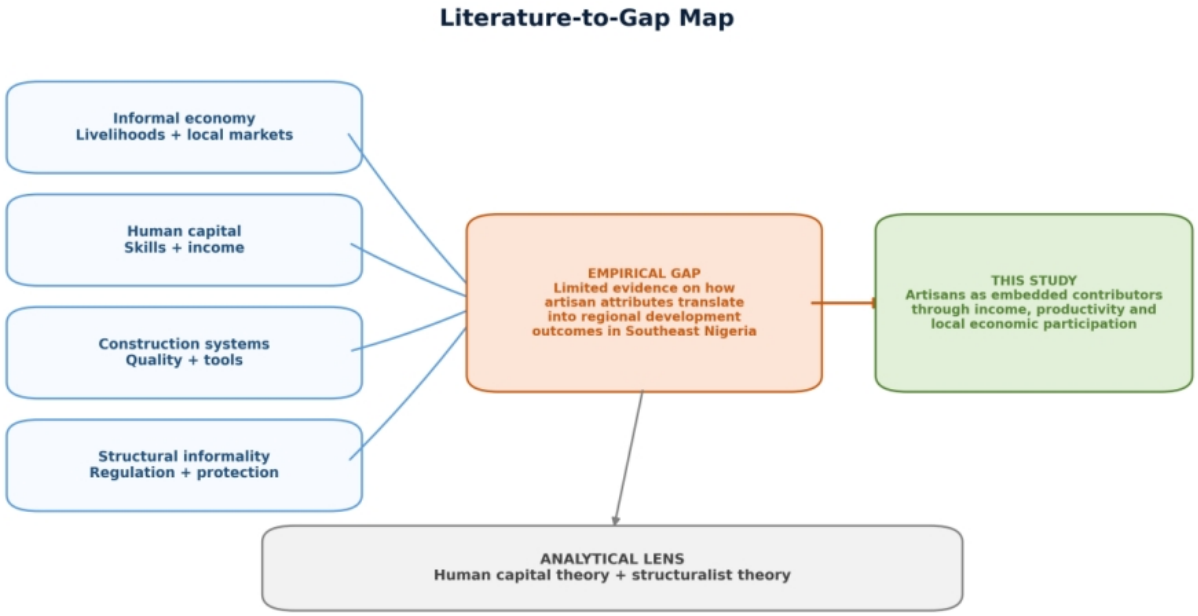


Figure 2: Literature-to-Gap Map

Note: *Author-generated synthesis of the cited literature (2026).*

Empirical Gap and Conceptual Position of the Study

The reviewed literature establishes that construction artisans are important to urban development, but it also reveals a clear empirical and conceptual gap. Existing studies provide valuable insights into craftsmanship, informal employment, human capital, construction skills and labour vulnerability. However, much of the literature either treats artisans from a cultural or technical perspective, discusses informal workers at a broad economy-wide level, or focuses on construction quality and skills gaps without jointly evaluating artisan characteristics, reported output, hiring frequency and economic participation across multiple southeastern Nigerian centres. The development role of artisans, therefore, remains fragmented across different bodies of literature. This paper brings these strands together around the question of measurable regional contribution in Southeastern Nigeria.

A second gap concerns the tendency to frame informal artisans as marginal actors rather than embedded contributors. Structuralist literature shows that informality is part of the organisation of urban economies, while human capital literature shows that skills and education influence productivity and income. However, few studies combine these perspectives to examine how artisan income supports household expenditure, local economic activity and regional development. This creates a conceptual weakness because artisans are often reduced to either vulnerable workers or technical labourers. The present study addresses this weakness by positioning artisans as functionally integrated actors whose income and labour have wider regional effects.

The study's conceptual position is therefore that informal construction artisans should be reframed as socio-economic determinants of regional development. Human capital theory explains why education, training, experience and skills influence productivity and income. Structuralist theory explains why artisans remain informal, vulnerable and under-recognised despite their contribution to construction activity and local economies. Combined, these perspectives provide a stronger basis for understanding artisans as both constrained workers and development agents. If limited human capital constrains income potential, and if artisan income drives household expenditure and local economic engagement, then artisans are not residual actors in regional development. They are embedded participants whose capacities can be strengthened through training, certification, tool support, social protection and inclusive construction policy.

Economic embeddedness offers a third, complementary perspective. Granovetter (1985) explains that economic action is shaped by ongoing social relations rather than by individual resources or formal institutions alone. This is relevant to artisans recruited through referrals, association networks and repeat engagements. In the present framework, human capital concerns workers' capabilities; structuralist theory concerns institutional and market constraints; and embeddedness concerns the networks through which work and payments are organised. Figure 1 brings these three dimensions together conceptually; it does not represent an estimated causal model.

The gaps are therefore both empirical and conceptual. Empirically, comparative artisan-level evidence is limited on whether education, competence and tool use are associated with engagement costs, hiring frequency and reported output in the selected cities. Conceptually, informal artisans are still often treated as marginal or residual actors rather than as embedded participants in regional economic systems. This paper addresses that gap by reframing informal construction labour as a socio-economic determinant of regional development. It argues that artisans' income and productivity are not isolated livelihood outcomes; they are linked to wider development processes through employment generation, household welfare, construction output, local expenditure and urban growth.

The literature, therefore, justifies a study that moves beyond describing artisans as informal workers. A stronger analytical approach must ask how their education, skills, income and economic participation produce measurable effects on regional development. This is why the present paper positions construction artisans as functionally integrated contributors to Southeastern Nigeria's urban and regional economies. Strengthening their human capital, improving access to tools, recognising apprenticeship pathways, extending social protection and designing inclusive policy frameworks would not only improve artisan welfare; it would also enhance productivity, construction quality and sustainable regional development. Table 1 summarises the key literature clusters and the gaps addressed by this study.

Table 1: Literature Clusters, Evidence and Outstanding Research Gaps

Literature cluster	What the literature establishes	Remaining gap	Analytical contribution
Informal economy and urban labour	Informal work absorbs labour, generates livelihoods and supports local markets.	Often too broad; it does not isolate artisans in the building construction industry.	Focuses specifically on artisans in Southeastern Nigeria.
Human capital and construction skills	Education, apprenticeship, experience and tools influence productivity and income.	Often stops at the skills gap without measuring regional spillovers.	Links human capital to income and economic participation.
Structural informality	Regulation, labour surplus, social protection and market demand shape artisan livelihoods.	Insufficient integration with productivity and regional development analysis.	Combines structuralist theory with human capital theory.
Construction quality and professional relations	Quality depends on artisans, professionals, materials, supervision and regulation.	Artisans are sometimes blamed without analysing the system around them.	Frames artisans as embedded construction actors in need of support.

Source: *Authors' synthesis of cited literature (2026).*

METHODOLOGY

The study was guided by an integrated methodological framework that ensured alignment between the research philosophy, theoretical orientation, methodological choice, research strategy, time horizon, data collection procedures and analytical techniques. This framework was adopted to move beyond a fragmented description of methods and to demonstrate how the study's underlying assumptions informed the selection of instruments, sampling procedures, data collection processes and statistical analysis. The study adopts a post-positivist orientation because the objective is to generate measurable evidence of the socio-economic contribution of informal construction artisans, while recognising that artisans operate within socially embedded informal labour systems. The aim is to estimate observable associations among artisan characteristics, reported output and local economic participation (Saunders et al., 2019; Creswell & Creswell, 2018).

The approach to theory is deductive and explanatory. The paper draws on human capital theory and structuralist accounts of informality to propose that education, skill, income and economic participation are associated with regional development outcomes. Consistent with Saunders et al. (2019), the deductive logic begins with an existing theoretical proposition, translates it into

measurable variables and examines the pattern of associations through empirical data. The design is therefore quantitative and cross-sectional because data were collected from artisans at a single point in time and analysed statistically to explain current relationships among variables. Cross-sectional surveys are appropriate where researchers seek standardised data from a relatively large population and where the interest is in patterns, associations and differences across groups (Bryman, 2016; Creswell & Creswell, 2018). These methodological decisions are summarised in Table 2.

Table 2: Methodological Decisions and Their Rationale

Prism layer	Decision in this study	Justification	Key support
Philosophy	Pragmatic/post-positivist	Allows measurable inference while recognising informal socio-economic context.	Saunders et al. (2019). Creswell and Creswell (2018)
Approach	Deductive, explanatory	Tests theoretically derived relationships among education, income and development outcomes.	Bryman (2016)
Choice/design	Quantitative cross-sectional survey	Captures standardised data from artisans at one point in time.	Creswell and Creswell (2018)
Strategy	Field survey of informal artisans	Appropriate for dispersed occupational groups and measurable variables.	Taherdoost (2016)
Sampling	Stratified random sampling	Ensures representation by city and trade category.	Etikan and Bala (2017)
Analysis	Descriptive and inferential statistics	Tests associations among the study variables.	Field (2018); Pallant (2020)

Source: *Authors' methodological synthesis based on the cited research-methods literature (2026).*

The study was conducted in three urban centres in Southeastern Nigeria: Owerri, Awka and Umuahia. These centres were selected because they are state capitals with active housing markets, dense informal labour networks and visible demand for artisan services. The target population comprised informal construction artisans in core building trades, namely masons, tilers, carpenters, plumbers, electricians and iron benders. Eligible respondents were construction artisans without Corporate Affairs Commission registration who could be identified through local trade association units and field enumeration. These artisans were selected as primary respondents because they directly undertake the trade activities and could report their own training, tools, engagements and remuneration. The accessible sampling frame contained 1,414 artisans, verified through union registers and direct enumeration by trained field assistants. A total of 425 questionnaires were administered to informal construction artisans across Owerri, Awka and Umuahia. However, after screening for completeness, consistency and usability, 384 questionnaires were validly returned and retained for analysis, representing a valid response rate of 90.4%. The final analysis was therefore based on 384

respondents. The sampling frame, questionnaires administered and usable responses are distinguished to clarify the basis of inference.

Primary data collection was coordinated by the researchers with the support of nine (9) trained field assistants, distributed equally across the three selected urban centres of Owerri, Awka and Umuahia, with three (3) assistants assigned to each city. The field assistants supported the identification and verification of eligible construction artisans through local trade association registers and direct field enumeration. Their responsibilities included facilitating contact with respondents, administering structured questionnaires through face-to-face interviews, clarifying questionnaire items where necessary, and checking completed questionnaires for completeness and consistency. The distribution of field assistants across the study locations facilitated field coverage and standardised questionnaire administration across the selected construction trades. Participation was voluntary, informed consent was obtained, and respondents' confidentiality was maintained throughout the data collection process.

Sample adequacy was evaluated using Cochran's (1977) procedure with a finite population correction. At a 95% confidence level, 5% margin of error and conservative population proportion of 0.5, the initial estimated requirement was approximately 384 responses. Correction for the sampling frame of 1,414 artisans yielded a minimum of 303. The field survey administered 425 questionnaires, 122 (40.3%) above that minimum, allowing the achieved sample to remain adequate after incomplete or unusable responses were excluded. Of the 425 questionnaires, 41 (9.6%) were not retained and 384 (90.4%) were included in the analysis, exceeding the corrected minimum by 81 (26.7%). The figures demonstrate the adequacy of the achieved sample and the allowance available for unusable returns; they do not independently establish the original administrative reason for selecting precisely 425 or the distribution across each city-by-trade stratum. Stratification by location and trade was intended to improve geographical and occupational coverage.

Sampling followed a stratified random procedure. The first stratum was location (Owerri, Awka and Umuahia), while the second stratum was trade category (masonry, tiling, carpentry, plumbing, electrical work and iron bending). Stratification was methodologically necessary because the work frequency, income patterns, skill requirements and economic contributions of each trade differ. The intent was to improve coverage of different locations and trades, although the available manuscript does not provide stratum-specific allocation figures or selection probabilities. Within each stratum, eligible artisans were selected from association lists and field-confirmed units. This approach is consistent with probability sampling principles, especially where the study population is heterogeneous and subgroup representation is necessary for reliable inference (Taherdoost, 2016; Etikan & Bala, 2017).

Primary data were collected through a structured questionnaire administered face-to-face. A structured format ensured consistent questions and comparable responses across the three cities and six trades. The questionnaire captured information on socio-economic characteristics, educational level, skill acquisition, trade experience, tools and techniques, frequency of engagement, income, household expenditure, reliance on construction income, taxation experience and local economic participation. Face-to-face administration was adopted because informal artisans are dispersed across construction sites and trade units. Interviewer clarification was intended to reduce item misinterpretation, while screening of returned questionnaires addressed incomplete or inconsistent responses. These measures may reduce, but cannot eliminate, recall, disclosure or coverage bias. The study also used limited field observation to contextualise artisans' tools, working conditions and operational practices.

Although the main design remained quantitative, observation enhanced contextual validity by enabling the researcher to compare reported practices with observable work realities. Secondary data from literature, policy documents and government reports were used to situate the primary findings within wider debates on informal labour and regional development. Table 3 sets out the study variables, their measurement and the analytical procedures.

Table 3: Study Constructs, Operational Indicators and Analytical Procedures

Construct	Operational indicators	Measurement logic	Statistical procedure
Human capital	Education, skill acquisition and years of trade experience	Ordinal/ratio indicators of productive capacity	Frequencies, percentages, Spearman/Kendall
Operational capacity	Tools, techniques, output level, work frequency	Trade-specific productivity indicators	Cross-tabulation, chi-square, correlation
Economic participation	Income, household expenditure, timing of remuneration and local purchases	Income and expenditure pathways	Descriptive statistics, cross-tabulation and association tests
Regional development contribution	Employment, livelihood dependence, local economic activity and housing support	Outcome indicators of spillover effects	Descriptive indicators and association tests; regional effects not directly estimated

Source: *Authors' compilation of study measures and analytical procedures (2026). Regional output was not measured independently.*

Questionnaire content was reviewed by subject experts for alignment with the research objectives and constructs. A pilot test was conducted with construction artisans outside the main survey to examine item clarity, sequencing and respondent burden. The available study documentation does not specify the pilot sample size, pilot location, item-level revisions or an observed Cronbach's alpha coefficient. Consequently, the study does not claim a quantified level of internal consistency or psychometric validity on the basis of an unreported coefficient (Cohen et al., 2018; Pallant, 2020). During the main survey, participation was voluntary, informed consent was obtained and unnecessary personal identifiers were not collected.

The survey data were coded, cleaned and analysed using IBM SPSS Statistics and Microsoft Excel. Data processing involved examining questionnaire responses for completeness, checking the consistency of variable coding and preparing the dataset for statistical analysis. Descriptive statistics, including frequencies, percentages, means and standard deviations, were employed to summarise respondents' socio-economic characteristics and employment patterns. Inferential statistical techniques comprised Spearman's rank correlation, Kendall's tau-b and Pearson's chi-square tests. Spearman's rank correlation and Kendall's tau-b were applied to examine associations involving ordinal variables, while Pearson's chi-square test was used to evaluate associations between categorical variables. The statistical procedures follow conventional guidance for categorical and ordinal data (Field, 2018; Pallant, 2020). Statistical significance was assessed at the 5% level ($p < 0.05$), with findings interpreted in relation to the

study objectives and theoretical framework. The exact IBM SPSS Statistics version is not recorded in the study documentation and is therefore not asserted.

Together, the cross-sectional survey, stratified field coverage and association tests provide evidence about relationships among the measured artisan characteristics. The tests do not identify causal effects or quantify regional multipliers. Limitations relating to incomplete stratum-level documentation, self-reported measures and the absence of an externally validated regional output indicator are considered in Sections 4 and 5.

RESULTS AND DISCUSSION

This section reports and discusses the quantitative evidence on how informal construction artisans contribute to regional development in Southeastern Nigeria. In contrast to a narrative or thematic qualitative discussion, the interpretation is organised around statistically observable relationships among human capital, artisan income, economic participation and regional spillover effects. The discussion follows the logic of the analytical model used in the study: first, it summarises the labour-market profile of the respondents; second, it interprets the inferential results; and third, it connects the findings to the human capital and structuralist literature on informal labour, construction productivity and regional development.

The respondent profile indicates substantial trade participation alongside limited access to formal training. Inferential results identify three statistically significant associations: educational status with cost of engagement, tools and techniques with reported output, and task competence with hiring frequency. The two remaining tests were not statistically significant. Collectively, these patterns provide artisan-level evidence of labour-market differentiation; they do not independently demonstrate the size of artisans' contribution to regional gross output or a causal household-income multiplier.

Table 4: Characteristics and Labour-Market Profile of Surveyed Construction Artisans

Indicator	Empirical pattern	Interpretive implication for regional development
Educational status	Secondary education: 58.1%; primary education: 35.8%; tertiary education: 5.2%; no formal education: 0.9%	Artisans are not unskilled by default; however, low levels of tertiary and technical certification constrain formal recognition and upgrading.
Formal/professional training	Never trained formally: 51.3%; trained once: 47.1%; trained twice: 1.6%	Apprenticeship and experience dominate skill formation, but weak formal training limits productivity, safety and technology adoption.
Task diversity	One trade: 35.3%; two to three trades: 64.5%; four to five trades: 0.2%	Multi-competence increases employability but may weaken deeper specialisation where certification is absent.
Site dominance	7-8 artisans per 10 workers: 44.5%; more	Artisan-intensive teams were common in respondents' accounts; not a population

	than 8 artisans: 17.6%	estimate.
Hiring frequency	13-18 engagements per 30-day month: 42.1%; 19-24 engagements: 21.6%	Repeated engagement may provide income opportunities, although frequency alone does not quantify multiplier effects.
Income vulnerability	69.2% earn less than ₦50,000 weekly; none earn above ₦100,000 weekly	Artisans contribute to development, but limited earnings restrict reinvestment in tools, training and enterprise growth.

Note: *Percentages are based on 384 valid survey responses. Source: Authors' tabulation compiled for the 2026 manuscript from the field survey; the original fieldwork year is not documented in the manuscript materials.*

The descriptive profile in Table 4 is important because it situates the inferential results within the social organisation of the construction labour market. The dominance of primary and secondary education indicates that most respondents have basic schooling but limited higher-level technical certification. This pattern is consistent with the human capital literature, which argues that education and training improve productivity and earnings, and it also helps explain why informal construction workers may remain excluded from regulated professional systems (Tunji-Olayeni et al., 2018; Afolabi et al., 2018). The weak level of formal professional training reinforces this point. More than half of the respondents had never participated in structured professional development, indicating that the sector's knowledge base remains substantially apprenticeship-driven. Apprenticeship is not a weakness in itself; it is a legitimate channel of tacit skill formation. The development concern is that tacit competence has not been sufficiently converted into certification, access to credit, tool upgrading or social protection.

The labour-market evidence also shows that artisans occupy a central position in building production. The finding that a substantial proportion of construction teams consist of seven or more artisans per ten workers suggests that artisan labour is prominent in the surveyed construction teams. The reported composition is not an independent census of the regional construction workforce. This finding supports the position in the informal economy literature that informal workers are frequently embedded in production systems even when they are weakly recognised by formal institutions (ILO, 2018; World Bank, 2021). It also explains why regional development analysis must look beyond registered professionals and formal contractors: the everyday physical expansion of urban centres depends heavily on the labour of informal artisans. Figure 3 illustrates the interpretation model used to discuss these relationships.



Figure 3: Interpretive Pathways From Artisan Characteristics to Possible Local Economic Linkages **Note**: *Author-generated conceptual interpretation (2026). No path coefficients or regional multipliers were estimated.*

Table 5: Reported Statistical Associations and Their Interpretation

Tested relationship	Statistic	Result	Decision/interpretation
Education status and cost of engagement	Spearman ρ	ρ = .207, p < .001	A small positive, statistically significant ordinal association; not a causal effect
Tools/techniques and output level	Kendall τb	τb = .302, p < .001	A moderate positive ordinal association between tool/technique category and reported output
Task competence and hiring frequency	Pearson χ^2	$\chi^2(6) = 18.361$, p = .005	Statistically significant association; direction requires cell frequencies
Skill level and reliance on construction income	Kendall τb	τb = .085, p = .079	No statistically significant ordinal association at α = .05
Remuneration timing and economic exchange timing	Pearson χ^2	$\chi^2(1) = 2.509$, p = .113	No statistically significant categorical association at α = .05
Development contribution dimensions	Descriptive	Training, earnings, spending, productivity and saving were discussed as possible pathways; no factor loadings are reported	Conceptual dimensions only; no empirical factor structure or regional multiplier estimated

Note: *ρ = Spearman's rho; τb = Kendall's tau-b; χ^2 = Pearson's chi-square; α = .05. Source: Authors' analysis compiled for the 2026 manuscript from field survey data; the original fieldwork year is not documented in the manuscript materials.*

As shown in Table 5, the significant positive relationship between educational status and cost of engagement (ρ = .207, p < .001) is substantively important because it indicates that informal construction labour is internally differentiated. Engagement costs vary with educational status, although this bivariate correlation does not isolate the effects of work experience, task competence or local demand. This aligns with human capital theory, which predicts that education, training and technical competence increase productivity and earnings. It also supports construction-skills studies that identify skill formation, apprenticeship and experience as critical to artisan productivity (Ayeniyo et al., 2020; Afolabi et al., 2018). However, the finding should not be over-read as evidence that individual education alone resolves artisan vulnerability. The descriptive pattern shows weak formal training, suggesting that many artisans possess practical competence without formal recognition. The result therefore points to a certification gap: artisans have productive skills, but these skills require institutional upgrading to generate higher earnings, safer practices and stronger development effects.

The association between tools and techniques and reported output (τb = .302, p < .001) suggests that operational resources are linked with artisans' self-reported production capacity. This is compatible with studies that identify tools, training and finance as constraints for Nigerian

artisans (Idowu et al., 2024; Ozigbo et al., 2025). Household expenditure, savings and local purchases are conceptually important economic pathways, but the present summary does not provide factor loadings, quantified expenditure flows or multiplier estimates. Accordingly, these dimensions are interpreted as potential linkages rather than as an independently validated factor structure.

Read together, the descriptive profile and the reported associations point to a dual position: artisans contribute labour to construction activity while facing income and skills constraints. Recent work on informal Nigerian enterprises shows that returns also vary by infrastructure, geography and enterprise characteristics (Nwaka & Emeagwali, 2024). The present study adds evidence from three southeastern state capitals but does not directly measure aggregate regional development, and its cross-sectional design prevents causal inference.

The relationship between tools, techniques and output strengthens the productivity dimension of the findings. The significant Kendall's Tau-b result ($\tau b = .302$, $p < .001$) indicates that better tools and techniques are associated with higher output. This finding is consistent with construction productivity studies which show that equipment quality, technical competence and technology adoption affect project performance (Puolitaival et al., 2019; Low et al., 2021). However, it also has a specific implication for informal construction labour: productivity upgrading cannot be achieved through training alone if artisans lack access to modern tools, credit and work-support infrastructure. The observed association is compatible with a constraint on upgrading, although the test does not establish whether better tools increase output or higher-output artisans are better able to obtain tools. Thus, the result supports an integrated intervention model that combines vocational training, tool-leasing schemes, microcredit, cooperative procurement and safety certification.

The significant association between task competence and hiring frequency ($\chi^2(6) = 18.361$, $p = .005$) indicates an association between task competence and hiring frequency. The summary statistic alone does not report the cell frequencies needed to establish which competence groups were hired most often. Diversification may nevertheless operate as a livelihood strategy under irregular work conditions. However, the result also raises concerns about quality and specialisation. While multiple competencies may increase employability, they may reduce incentives for deep specialisation unless supported by certification and continuing professional development. This interpretation is consistent with studies on the artisan-professional skills gap, which warn that weak technical upgrading and limited formal recognition can undermine construction quality and long-term project performance (Afolabi et al., 2018; Ayeniyo et al., 2020).

The non-significant result for skill level and reliance on construction income ($\tau b = .085$, $p = .079$) is equally important. It provides insufficient evidence of an ordinal association between these measures at the 5% threshold; this does not establish that all skill categories have identical income dependence. This finding supports a structuralist interpretation of informality. Artisans' economic vulnerability is not produced only by individual skill limitations, but also by broader conditions such as labour surplus, weak regulation, limited social protection, irregular project demand and the absence of formal income-stabilisation mechanisms (ILO, 2018; OECD & International Labour Organization, 2019). This is why the study's theoretical framing combines human capital and structuralist perspectives. Human capital explains why education and skill influence earnings, but structuralism explains why even skilled artisans may remain income-vulnerable within an informal construction economy.

The results add to construction-sector research by bringing together education, tool use, hiring and livelihood dependence in an artisan-level analysis across three southeastern Nigerian cities. They align with evidence of training needs in Edo State (Idowu et al., 2024) and limited tool access in Enugu (Ozigbo et al., 2025). In contrast, the non-significant skill–income-dependence result cautions against treating greater individual skill as sufficient protection against insecure livelihoods. This is compatible with Ozigbo et al.'s (2025) finding that structural problems were widely shared across artisan groups. Occupational injury research in Osun State (Ojo et al., 2025) additionally indicates that improvements in earnings and productivity should not be pursued separately from worksite safety. The distinctive contribution here is the joint comparison of significant and non-significant artisan-level associations rather than a direct estimate of regional economic impacts.

The policy implication is therefore not to treat artisans as a temporary category to be eliminated through formalisation, nor as an unregulated workforce to be ignored. A more developmentally useful approach is progressive integration. This would involve recognising apprenticeship pathways, creating certification systems for informal skills, supporting the acquisition of cooperative tools, improving access to occupational safety training, and designing social protection instruments that reflect project-based employment. Such interventions may improve productivity and income while preserving the sector's labour-intensive development function. The findings, therefore, support a conceptual shift from marginality to embeddedness: informal construction artisans should be incorporated into regional development planning as productive actors whose human capital and economic participation can be strengthened for broader urban transformation. The evidence aligns with ILO (2018) and OECD and International Labour Organization (2019) on the economic role and vulnerability of informal workers. It extends these broader accounts by identifying construction-specific associations between education and engagement cost, tools and output, and task competence and hiring frequency.

Finally, the interpretation should be read with appropriate statistical caution. The cross-sectional design limits the ability to draw strong causal claims, and self-reported income may be affected by recall or disclosure bias. However, these indicators and tests support a cautious interpretation of labour-market embeddedness, rather than causal regional economic effects. The evidence shows that informal construction artisans are not merely residual labourers within the urban economy. They are income earners, employers, trainers, consumers, tool users and local-market participants whose work contributes to both the physical production and economic reproduction of regional urban development.

CONCLUSION AND RECOMMENDATIONS

This study examined the contribution of informal construction artisans to regional development in Southeastern Nigeria, with particular attention to how their socio-economic characteristics, income patterns and economic participation shape local development outcomes. The findings show that informal construction artisans are not marginal or residual actors in the construction economy; rather, they are functionally embedded in the production of housing, employment creation, household welfare and local economic circulation. Masons, tilers, carpenters, plumbers, electricians and iron benders remain central to urban growth because their labour supports building delivery, repair works, infrastructure maintenance and the everyday expansion of cities.

The study further finds selected associations consistent with the relevance of human capital to artisans' work and labour valuation. Educational status, tool access and task competence were

associated with specific survey indicators, while reliance on construction income was not significantly related to reported skill level. However, the contribution of artisans is constrained by weak institutional recognition, inadequate access to modern tools, limited social protection, poor certification systems and the largely informal nature of their work. This means that artisan productivity cannot be improved through individual effort alone; it requires deliberate institutional support and policy inclusion.

The study therefore concludes that informal construction artisans should be recognised as socio-economic agents whose work is relevant to regional development through employment, household expenditure, local purchases, apprenticeship systems and construction output. Their reported participation in construction markets suggests pathways to household livelihoods and local spending, although the scale of those linkages was not directly estimated. Strengthening the artisan economy is therefore both a labour welfare issue and a regional development strategy.

Based on these findings, the study recommends that government agencies, professional bodies and technical institutions should establish targeted training and certification programmes for construction artisans. Such programmes should focus on practical skills, safety standards, modern construction techniques, tool use, construction ethics and basic enterprise management. Artisan registration should also be promoted through cooperative associations and trade-based databases, not as a punitive formalisation measure, but as a means of improving visibility, planning, training access and policy support.

In addition, state and local governments should introduce tool-upgrading schemes, micro-credit support and affordable equipment financing to improve artisans' productivity and construction quality. Social protection should also be extended to informal construction workers through health insurance, accident coverage, pension inclusion and worksite safety support. Finally, urban and regional development policies should explicitly integrate construction artisans into housing, employment and infrastructure development frameworks. Recognising and strengthening artisans' role will enhance livelihood security, improve construction outcomes and promote more inclusive and sustainable regional development in Southeastern Nigeria.

The study is limited by its cross-sectional design, self-reported measures, selected trade-association and field-access frame, and coverage of only three state capitals. Data collection safeguards included the use of a standardised instrument, trained assistants and screening of questionnaires; nevertheless, coverage, recall, disclosure and nonresponse bias cannot be ruled out. The original stratum allocations and a full statistical output file were not available for this manuscript-level review. Although the measured associations illuminate artisan labour-market participation, no independent measure of regional economic output or multiplier effects was estimated. Future studies should extend the sampling frame to rural and non-associated artisans, report stratum-specific response patterns, follow workers longitudinally and combine survey data with verified earnings, expenditure and construction-output records.

Ethics Approval

Ethical approval for this study was obtained from the Research Ethics Committee, Higher Degrees Programs Committee, Faculty of Environmental Sciences, Imo State University, Owerri, Nigeria. The research was conducted in accordance with established ethical principles governing research involving human participants. Participation was entirely voluntary, and informed consent was obtained from respondents before questionnaire administration.

Participants were informed of the purpose of the study and their right to decline participation or withdraw without adverse consequences. Confidentiality and anonymity were maintained throughout the research process, and personally identifiable information was excluded from the analytical dataset. Data collected were used exclusively for academic research purposes.

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Conflict of Interest

The authors declare that they have no financial, professional, personal or other competing interests that could have influenced the design, conduct, analysis, interpretation or reporting of this research.

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REFERENCES

Afolabi, A. O., Ojelabi, R. A., Omuh, I., Tunji-Olayeni, P., & Adeyemi, M. (2018). Critical success factors influencing productivity of construction artisans in the building industry. *International Journal of Mechanical Engineering and Technology*, *9(8)*, 858–867. https://iaeme.com/Home/article_id/IJMET_09_08_092

Agenbag, H., & Amoah, C. (2021). The impact of modern construction technology on the workforce in the construction industry. *IOP Conference Series: Earth and Environmental Science*, *654(1)*, Article 012001. https://doi.org/10.1088/1755-1315/654/1/012001

Al Asali, M. W. (2020). Craftsmanship for reconstruction: Artisans shaping Syrian cities. In Urban Book Series. Springer. https://doi.org/10.1007/978-3-030-22762-3_8

Ayeniyo, O. I., Oluwale, B. A., & Olanipekun, E. A. (2020). Technical capability of artisans in building construction industry: Empirical evidence from Lagos State, Nigeria. African Journal of Science Policy and Innovation Management, 1(1), 50–63. https://ajspim.oauife.edu.ng/index.php/ajspim/article/view/16

Bryman, A. (2016). *Social research methods* (5th ed.). Oxford University Press. https://global.oup.com/academic/product/social-research-methods-9780199689453

Chipangura, N. (2019). 'We are one big happy family': The social organisation of artisanal and small-scale gold mining in Eastern Zimbabwe. *The Extractive Industries and Society*, *6(4)*, 1265–1273. https://doi.org/10.1016/j.exis.2019.08.001

Cochran, W. G. (1977). *Sampling techniques* (3rd ed.). John Wiley & Sons. https://www.wiley.com/en-gb/sampling-techniques-3rd-edition-p-9780471162407

Cohen, L., Manion, L., & Morrison, K. (2018). *Research methods in education* (8th ed.). Routledge. https://doi.org/10.4324/9781315456539

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE. https://us.sagepub.com/en-us/nam/research-design/book255675

De Munck, B. (2019). Artisans as knowledge workers: Craft and creativity in a long-term perspective. *Geoforum*, *99*, 227–237. https://doi.org/10.1016/j.geoforum.2018.05.025

Decker, D. (2019). Student perceptions of higher education and apprenticeship alignment. *Education Sciences*, *9(2)*, Article 86. https://doi.org/10.3390/educsci9020086

Ebekozien, A., Hafez, M. A., Aigbavboa, C., Samsurijan, M. S., Oke, E. A., Ebekozien, E. O., & Momoh, N. I. (2024). Appraising the impact of currency redesign on the Nigerian construction artisans in the informal sector. *Environment and Social Psychology*, *9(9)*, Article 2968. https://doi.org/10.59429/ESP.V9I9.2968

Etikan, I., & Bala, K. (2017). Sampling and sampling methods. *Biometrics & Biostatistics International Journal*, *5(6)*, 215–217. https://doi.org/10.15406/bbij.2017.05.00149

Fei, W., Opoku, A., Agyekum, K., Oppon, J. A., Ahmed, V., Chen, C., & Lok, K. L. (2021). The critical role of the construction industry in achieving the Sustainable Development Goals (SDGs): Delivering projects for the common good. *Sustainability*, *13(16)*, Article 9112. https://doi.org/10.3390/su13169112

Field, A. (2018). *Discovering statistics using IBM SPSS Statistics* (5th ed.). SAGE. https://us.sagepub.com/en-us/nam/discovering-statistics-using-ibm-spss-statistics/book257672

Granovetter, M. (1985). Economic action and social structure: The problem of embeddedness. *American Journal of Sociology*, *91(3)*, 481–510. https://doi.org/10.1086/228311

Idowu, A. O., Aigbavboa, C., & Oke, A. E. (2024). Training techniques for artisans to improve construction project performance in Edo State, Nigeria. *International Journal of Sustainable Construction Engineering and Technology*, *15(3)*, 80–86. https://doi.org/10.30880/ijscet.2024.15.03.008

International Labour Organization. (2016). *Non-standard employment around the world: Understanding challenges, shaping prospects*. International Labour Office. https://www.ilo.org/publications/non-standard-employment-around-world-understanding-challenges-shaping-prospects

International Labour Organization. (2018). *Women and men in the informal economy: A statistical picture* (3rd ed.). International Labour Office. https://www.ilo.org/publications/women-and-men-informal-economy-statistical-picture-third-edition

International Labour Organization. (2020). *World employment and social outlook: Trends 2020*. International Labour Office. https://www.ilo.org/publications/world-employment-and-social-outlook-trends-2020

Jankova, L., Lazdins, A., Dobele, M., & Dobele, A. (2020). Topicality of crafts in the development of Jelgava old town quarter. In Economic Science for Rural Development 2020 (No. 53, pp. 168–176). https://doi.org/10.22616/ESRD.2020.53.019

Kroezen, J., Ravasi, D., Sasaki, I., Żebrowska, M., & Suddaby, R. (2021). Configurations of craft: Alternative models for organizing work. *Academy of Management Annals*, *15(2)*, 502–536. https://doi.org/10.5465/annals.2019.0145

Low, S. P., Gao, S., & Ng, E. W. L. (2021). Future-ready project and facility management graduates in Singapore for Industry 4.0: Transforming mindsets and competencies. *Engineering, Construction and Architectural Management*, *28(1)*, 270–290. https://doi.org/10.1108/ECAM-08-2018-0322

Mahadea, D., & Zogli, L.-K. J. (2018). Constraints to growth in informal sector activities and formalisation: A case study of Ghanaian slums. *The Southern African Journal of*

Entrepreneurship and Small Business Management, *10(1)*, Article a130. https://doi.org/10.4102/sajesbm.v10i1.130

Medina, L., Jonelis, A. W., & Cangul, M. (2017). The informal economy in Sub-Saharan Africa: Size and determinants (IMF Working Paper No. 17/156). International Monetary Fund. https://doi.org/10.5089/9781484305942.001

Mukherjee, J., & Ghosh, M. (2020). Traditional crafts as materials in placemaking: Application and *sustainability* in aesthetic transformation of geometry of urban public spaces. In Encyclopedia of renewable and sustainable materials. Elsevier. https://doi.org/10.1016/B978-0-12-803581-8.11315-3

Nwaka, I. D., & Emeagwali, O. L. (2024). Participation and returns from informal service-oriented non-farm enterprises: Evidence from a survey of Nigerian households. *PLOS ONE*, *19(3)*, Article e0298794. https://doi.org/10.1371/journal.pone.0298794

OECD & International Labour Organization. (2019). *Tackling vulnerability in the informal economy*. OECD Publishing. https://doi.org/10.1787/939b7bcd-en

Ojo, T. O., Onayade, A. A., & Naicker, N. (2025). Factors associated with occupational injuries among bricklayers and carpenters in building construction: Insights from a mixed methods study in Osun State, Nigeria. *BMC Public Health*, *25*, Article 277. https://doi.org/10.1186/s12889-025-21473-5

Ozigbo, C. A., Okeke, F. O., Mba, E. J., Ozigbo, I. W., Oforji, P. I., Ogbuefi, P. C., Onyia, C. D. F., Ugwu, B. U., Onyia, S. C., Okolo, E. O., & Ogbodo, E. E. (2025). The invisible pillars: Mapping the challenges and sustainable solutions for Nigeria's construction artisans. *Discover Sustainability*, *6*, Article 789. https://doi.org/10.1007/s43621-025-01584-0

Pallant, J. (2020). *SPSS survival manual: A step by step guide to data analysis using IBM SPSS* (7th ed.). Routledge. https://doi.org/10.4324/9781003117452

Puolitaival, T., Davies, K., & Kähkönen, K. (2019). Digital technologies and related competences in construction management in the era of fast-paced digitalisation. In Proceedings of CIB World Building Congress 2019: Constructing Smart Cities, Hong Kong. https://researchportal.tuni.fi/en/publications/digital-technologies-and-related-competences-in-construction-mana/

Ranganathan, A. (2018). The artisan and his audience: Identification with work and price setting in a handicraft cluster in Southern India. *Administrative Science Quarterly*, *63(3)*, 637–667. https://doi.org/10.1177/0001839217725782

Salvatori, A., & Manfredi, T. (2019). Job polarisation and the middle class: New evidence on the changing relationship between skill levels and household income levels from 18 OECD countries (OECD Social, Employment and Migration Working Papers No. 232). OECD Publishing. https://doi.org/10.1787/4bf722db-en

Saunders, M., Lewis, P., & Thornhill, A. (2019). *Research methods for business students* (8th ed.). Pearson. https://www.pearson.com/en-gb/subject-catalog/p/research-methods-for-business-students/P200000005358

Speecke, M. (2022). The spatial politics of craft guilds in fourteenth-century Flanders. *Medieval Low Countries*, *9*, 7–42. https://doi.org/10.1484/J.MLC.5.134618

Squassina, A. (2022). Construction wisdom: Preserving Venice with both tradition and innovation. *Studies in Conservation*, *67*(sup1), 253–259. https://doi.org/10.1080/00393630.2022.2046413

Taherdoost, H. (2016). Sampling methods in research methodology: How to choose a sampling technique for research. *International Journal of Academic Research in Management*, *5(2)*, 18–27. https://doi.org/10.2139/ssrn.3205035

Testolini, V., Thompson, L., & Lemorini, C. (2023). Archaeological science and experimental archaeology can inform sustainable innovative craft. *Sustainability*, *15(20)*, Article 14685. https://doi.org/10.3390/su152014685

Tunji-Olayeni, P. F., Omuh, I. O., Ojelabi, R. A., & Afolabi, A. O. (2018). Social and financial capital of craftsmen in the construction industry. *International Journal of Civil Engineering and Technology*, *9(6)*, 1107–1113. https://iaeme.com/Home/article_id/IJCIET_09_06_125

UN-Habitat. (2020). *World cities report 2020: The value of sustainable urbanization*. United Nations Human Settlements Programme. https://unhabitat.org/world-cities-report-2020-the-value-of-sustainable-urbanization

Wijayaningtyas, M., Lukiyanto, K., Nursanti, E., & Laksmana, D. I. (2022). The effect of economical phenomenon on informal construction workers earnings within Covid-19 pandemic: A mixed method analysis. Heliyon, 8(8), Article e10321. https://doi.org/10.1016/j.heliyon.2022.e10321

World Bank. (2021). *The long shadow of informality: Challenges and policies*. World Bank. https://www.worldbank.org/en/research/publication/informal-economy