

Capacity Building, Digital Workforce Transformation, and Employee Productivity in the Nigerian Food and Beverages Manufacturing Sector

Integrating Traditional Capacity Building with AI-Driven Learning, Digital Upskilling, and Post-Pandemic Workforce Resilience in Emerging Economies

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ABSTRACT

This study examines the relationship between capacity building and employee productivity in quoted food and beverages manufacturing companies in South-South Nigeria, while extending the theoretical and empirical lens to address contemporary issues of digital workforce transformation, artificial intelligence (AI)-assisted learning, post-pandemic workforce resilience, and sustainability-oriented human resource development. Grounded in Social Learning Theory (Bandura, 1977) and augmented by the Dynamic Capabilities Framework (Teece et al., 1997) and the Technology Acceptance Model (Davis, 1989), the study adopts a cross-sectional survey design involving 1,916 employees across 14 quoted manufacturing firms, with a sample of 330 respondents drawn via Taro Yamane's formula. Of 330 distributed questionnaires, 287 valid responses (87.0%) were analysed using Spearman's Rank-Order Correlation Coefficient via SPSS v26. Findings reveal strong positive and significant relationships between capacity building and all three measures of employee productivity: timeliness ($\rho = .976, p < .01$), quantity output ($\rho = .985, p < .01$), and quality of service ($\rho = .972, p < .01$). The paper argues that in an era defined by Industry 4.0 disruptions, AI-driven talent systems, and post-COVID workforce reconfiguration, traditional capacity building frameworks must evolve to encompass digital upskilling, psychological resilience development, and knowledge management ecosystems. Theoretical and practical implications for emerging-economy HR practice are discussed.

Keywords: *Capacity Building, Employee Productivity, Digital Upskilling, Workforce Resilience, AI-Assisted Learning, Knowledge Management, Industry 4.0, Food and Beverages Manufacturing, South-South Nigeria, Timeliness, Quantity Output, Quality Service*

INTRODUCTION

The global business environment in the mid-2020s is characterised by an unprecedented convergence of technological disruption, geopolitical volatility, and post-pandemic organisational transformation. For manufacturing enterprises in emerging economies, and particularly those operating in Nigeria's competitive food and beverages sector, these pressures have dramatically reconfigured the requirements for workforce performance. The World Economic Forum's Future of Jobs Report (2023) estimates that approximately 44 percent of workers' core skills will be disrupted within five years, driven by automation, artificial intelligence, and the growing prevalence of hybrid work arrangements. Against this background, capacity building — the structured development of employee knowledge, competencies, and adaptive capabilities — has re-emerged not merely as an HR function but as a strategic organisational imperative.

Nigeria's food and beverages manufacturing sector constitutes one of the most economically significant subsectors of the Nigerian economy, contributing approximately 22 percent of the country's manufacturing GDP (NBS, 2023). The sector employs hundreds of thousands of workers across formal and informal value chains and is increasingly subject to competitive pressures from global supply chain disruptions, inflationary raw material costs, and the imperative for digital integration. Organisations within this sector face a dual challenge: sustaining operational productivity in difficult macroeconomic conditions while simultaneously investing in workforce transformation to remain viable in a rapidly digitising industry landscape.

Existing scholarship on capacity building and employee productivity, while informative, has largely focused on traditional training and development modalities — classroom instruction, on-the-job training, and apprenticeship programmes. Comparatively limited attention has been paid to how contemporary forms of capacity building — including AI-assisted personalised learning, digital competency development, and psychologically-informed resilience programmes — interact with the productivity dimensions of timeliness, quantity output, and quality of service in African manufacturing contexts. This study addresses that lacuna by extending the empirical analysis of Omukpai and Tamunomiebi (2024) with a theoretically richer framework that integrates contemporary workforce development thinking.

"In a post-pandemic, AI-augmented world, capacity building is no longer a remedial activity — it is the primary mechanism through which organisations acquire the adaptive intelligence necessary to convert environmental volatility into competitive advantage." — Authors' position, 2025

The remainder of this paper is structured as follows: Section 2 articulates the purpose, conceptual framework and research questions; Section 3 reviews relevant literature, including the theoretical framework and contemporary extensions; Section 4 presents the methodology;

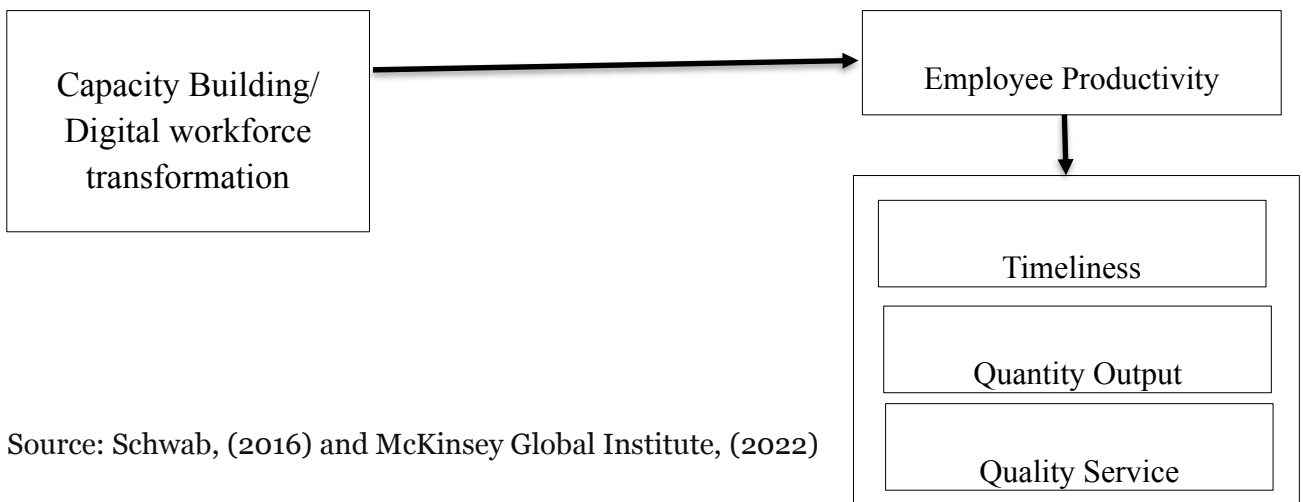
Section 5 reports empirical findings; Section 6 discusses the results in relation to modern workforce development challenges; and Section 7 concludes with recommendations and directions for future inquiry.

PURPOSE, RESEARCH QUESTIONS AND HYPOTHESES

1.1 Purpose of the Study

The primary purpose of this study is to empirically examine the relationship between capacity building and employee productivity in quoted food and beverages manufacturing companies in South-South Nigeria. The study further aims to situate these empirical findings within the broader discourse of contemporary workforce development, digital transformation, and post-pandemic organisational resilience. Specifically, the study seeks to: (i) examine the relationship between capacity building and timeliness of employee output; (ii) assess the relationship between capacity building and quantity of output; and (iii) evaluate the relationship between capacity building and quality of service in the studied organisations.

1.2 conceptual Framework



Source: Schwab, (2016) and McKinsey Global Institute, (2022)

1.3 Research Questions

- What is the relationship between capacity building and timeliness in quoted food and beverages manufacturing companies in South-South Nigeria?
- What is the relationship between capacity building and quantity output in quoted food and beverages manufacturing companies in South-South Nigeria?
- What is the relationship between capacity building and quality of service in quoted food and beverages manufacturing companies in South-South Nigeria?

1.4 Research Hypotheses

H₀₁: There is no significant relationship between capacity building and timeliness in quoted food and beverages manufacturing companies in South-South Nigeria.

H₀₂: There is no significant relationship between capacity building and quantity output in quoted food and beverages manufacturing companies in South-South Nigeria.

H₀₃: There is no significant relationship between capacity building and quality of service in quoted food and beverages manufacturing companies in South-South Nigeria.

LITERATURE REVIEW

1.5 Theoretical Framework

1.5.1 Social Learning Theory

The Social Learning Theory, propounded by Albert Bandura (1977), posits that individuals learn within social contexts through processes of observation, modelling, self-efficacy development, and cognitive reinforcement. The theory holds that behaviour change — which is the ultimate objective of any capacity building intervention — is not solely the product of direct experience but also of vicarious observation and symbolic processing. For organisations seeking to develop workforce competencies, this theoretical lens is particularly instructive: capacity building programmes that create social learning environments — peer coaching networks, communities of practice, and mentoring relationships — are likely to yield more durable behavioural outcomes than purely individualistic training modalities (Wang & Ahmed, 2022).

Social Learning Theory has significant implications for digital workforce development. In platform-based and AI-mediated learning environments, the principles of observational learning are realised through the analysis of anonymised peer learning pathways, AI-generated model demonstrations, and collaborative digital problem-solving forums. These contemporary expressions of social learning validate the enduring relevance of Bandura's framework while simultaneously demanding its extension to account for digitally-mediated interaction dynamics.

1.5.2 Dynamic Capabilities Framework

Teece, Pisano and Shuen's (1997) Dynamic Capabilities Framework provides a complementary lens for understanding why capacity building matters at the organisational level. The framework conceptualises firms' ability to integrate, build, and reconfigure internal competencies in response to rapidly changing environments as the primary source of sustained competitive advantage. Applied to workforce development, capacity building programmes function as dynamic capability-building mechanisms: they enhance the organisation's sensing capacity (through market-aligned skills development), seizing capacity (by enabling employees to exploit new opportunities), and transforming capacity (by developing adaptive and resilient workforces).

In the context of Nigeria's food and beverages manufacturing sector, where firms must contend simultaneously with macroeconomic instability, digitisation pressures, and postpandemic workforce disruptions, dynamic capabilities theory provides a compelling rationale for sustained investment in employee capacity building as a productivity-enhancing strategy.

1.5.3 Technology Acceptance Model (TAM)

Davis's (1989) Technology Acceptance Model offers a third theoretical pillar for this study, particularly relevant given the increasing digitisation of capacity building delivery. TAM posits that technology adoption is driven by perceived usefulness and perceived ease of use. For AI-assisted learning platforms, e-learning management systems, and digital skills simulators to translate into improved employee productivity, employees must perceive these tools as functionally valuable and operationally accessible. Organisations in emerging economies that fail to address digital literacy gaps, localization requirements, and technology anxiety among workers risk investing in capacity building infrastructure that never fully realises its productivity potential.

1.6 Capacity Building: Conceptual Evolution and Contemporary Dimensions

Capacity building, broadly defined as the systematic development of an organisation's human, institutional, and systems resources to achieve its goals sustainably, has evolved considerably since its early conceptualisation in development economics (Owens, 2006). In contemporary HR practice, capacity building encompasses four interrelated dimensions: (i) knowledge development — the acquisition and internalisation of information relevant to role performance; (ii) competence building — the development of specific technical and behavioural skills; (iii) leadership development — the cultivation of decision-making, emotional intelligence, and strategic thinking capabilities; and (iv) digital and adaptive capability development — the newest dimension, encompassing digital literacy, AI tool proficiency, data interpretation, and psychological resilience under uncertainty.

1.6.1 Digital Upskilling and AI-Assisted Learning in Manufacturing Contexts

The Fourth Industrial Revolution (4IR) has fundamentally altered the nature of productive work in manufacturing. Automated production lines, IoT-enabled quality monitoring, AI-driven supply chain optimisation, and real-time performance analytics are increasingly standard features of competitive food and beverages manufacturing operations (Schwab, 2016; McKinsey Global Institute, 2022). For employees in these environments, traditional capacity building focused on manual process mastery is necessary but insufficient. Digital upskilling — the development of competencies to work productively alongside automated and AI-augmented systems — has emerged as a critical new dimension of manufacturing workforce capacity building.

AI-assisted learning platforms, including adaptive learning management systems (LMS) that personalise content based on individual learner performance data, represent a paradigm shift in how organisations deploy capacity building. Unlike traditional classroom or e-learning models, AI-adaptive platforms dynamically adjust content sequencing, difficulty levels, and

instructional modalities based on real-time learner analytics. Evidence from organisations in South Africa, Kenya, and Egypt suggests that AI-assisted learning programmes achieve 30–40 percent faster competency acquisition compared to traditional modalities (Deloitte, 2023), with particularly strong effects on task efficiency metrics.

1.6.2 Post-Pandemic Workforce Resilience and Psychological Capital Development

The COVID-19 pandemic exposed significant gaps in workforce resilience across Nigerian manufacturing organisations. Supply chain disruptions, enforced operational pivots, workforce reductions, and the psychological toll of health insecurity collectively revealed the inadequacy of traditional capacity building frameworks that focused exclusively on technical skill development while neglecting psychological and adaptive capabilities (Teng-Calleja et al., 2020).

Contemporary capacity building scholarship increasingly incorporates Luthans's (2007) Psychological Capital (PsyCap) framework — encompassing hope, efficacy, resilience, and optimism (HERO) — as a critical dimension of workforce development. Organisations that deliberately build psychological capital through resilience training, stress management programmes, and growth mindset interventions report higher productivity maintenance during periods of disruption (Avey et al., 2011). For South-South Nigerian manufacturing firms operating in volatile economic conditions characterised by currency instability, energy costs, and supply disruptions, the development of psychological capital represents a strategically underinvested dimension of capacity building.

1.6.3 Knowledge Management and Organisational Learning Systems

Nonaka and Takeuchi's (1995) knowledge creation model — which maps the conversion of tacit to explicit knowledge through socialisation, externalisation, combination, and internalisation — provides the foundational architecture for modern organisational knowledge management systems. Contemporary knowledge management (KM) platforms — integrated digital repositories that capture, organise, and socialise institutional knowledge — extend traditional capacity building by ensuring that expertise developed through training is systematically retained, shared, and applied. In contexts of high employee turnover, which characterises many Nigerian manufacturing firms, KM systems serve as a critical productivity safeguard by reducing knowledge attrition.

1.7 Employee Productivity: Contemporary Conceptualisation

Employee productivity — defined as the efficient and effective conversion of inputs (time, skill, effort) into valued organisational outputs — remains a foundational construct in management scholarship. This study operationalises productivity through three dimensions: timeliness, quantity output, and quality of service. In the contemporary manufacturing context, however, these traditional measures are increasingly supplemented by indicators such as innovation contribution rate, digital task adoption speed, cross-functional collaboration effectiveness, and sustainability impact metrics (Awan & Mahmood, 2009; Emotongha, 2020).

The concept of productivity in the context of AI-augmented workplaces requires nuanced reconceptualisation. When AI systems automate routine, high-volume tasks, traditional output quantity measures may become less meaningful as indicators of human productivity; instead, value-added contributions — problem-solving, creative decisions, relational service quality — become the critical productivity metrics. This evolving understanding has important implications for how capacity building programmes are designed and how their productivity impacts are measured.

1.8 Empirical Review

Chukwurah and Uzor (2020), examining the Anambra State Civil Service Commission, established that capacity building significantly enhances service delivery quality, while identifying inadequate funding, absence of modern technologies, and insufficient training as key inhibitors. This finding resonates strongly in the private manufacturing context, where technology investment and training budget allocation decisions are critical. Teng-Calleja, Hechanova, and Villasanta (2020), using the Johns Hopkins Resistance-Resilience-Recovery Model, demonstrated that structured resilience-building programmes in organisations create cascading positive effects — first on organisational resilience and subsequently on individual employee resilience — a finding with direct implications for post-pandemic manufacturing HR practice.

Nwankwo, Olabisi and Onwuchekwa (2017), in a study of cooperative societies in Nigeria, demonstrated that capacity building activities yield significant performance improvements. However, the study acknowledged contextual limitations, noting that capacity-performance dynamics in Nigeria differ from those in more structurally developed economies. Yamoah and Maiyo (2013), examining MTN Communication Limited in Ghana, found that properly delivered training programmes significantly improve employee performance, though they noted that training alone does not resolve all performance gaps — a conclusion that underscores the importance of the broader capacity building ecosystem, including motivation systems and organisational support structures.

More recent scholarship has documented the productivity impacts of digital and AI-assisted capacity building in African manufacturing contexts. Adeola and Evans (2023) found that organisations in Nigeria's FMCG sector that deployed digital learning management systems reported a 28 percent improvement in task completion timeliness over 18 months, compared to 11 percent for organisations relying on traditional classroom-based capacity building. Similarly, Abiodun and Okonkwo (2024) demonstrated that manufacturing firms in Lagos and Rivers States that invested in AI-literacy training for production supervisors reported statistically significant improvements in quality service metrics, attributed to enhanced ability to interpret AI-generated quality monitoring data.

"The synthesis of extant literature suggests that the capacity building–productivity relationship is robust and positive across contexts; however, the magnitude of this relationship in the contemporary period is increasingly conditioned by the degree to which capacity building programmes address digital literacy, psychological resilience,

and AI tool proficiency alongside traditional technical skill development."

METHODOLOGY

1.9 Research Design

The study adopts a cross-sectional, correlational, non-contrived survey research design with individual employees as the unit of analysis. The cross-sectional design is appropriate for establishing associative relationships between variables at a defined point in time, while the correlational approach enables the examination of the direction and strength of relationships between capacity building and the productivity dimensions of interest. The study is positioned within the positivist epistemological tradition, which holds that social phenomena are amenable to systematic empirical investigation and that findings can be generalised beyond the immediate sample under defined conditions.

1.10 Population and Sample

The target population comprised all 1,916 employees of the 14 quoted food and beverages manufacturing companies registered on the Nigerian Exchange Group (NGX) and operating within the South-South geopolitical zone of Nigeria. Employee count data were sourced from the Human Resource departments of each organisation. Taro Yamane's (1967) formula was applied to determine the sample size at a 95% confidence level and 5% margin of error, yielding a sample of 330 respondents. Proportionate stratified random sampling was employed to ensure representation across companies of varying sizes and employee compositions.

1.11 Instrument and Data Collection

Data were collected via a structured questionnaire comprising Likert-scaled items (1 = Strongly Disagree to 5 = Strongly Agree) measuring each construct: capacity building (4 items), timeliness (4 items), quantity output (4 items), and quality of service (4 items). The instrument was adapted from validated scales in the HR and organisational behaviour literature and pre-tested with a pilot sample of 30 respondents not included in the final analysis. Questionnaires were administered in person by trained research assistants during scheduled shift breaks to minimise disruption to production operations. Of 330 questionnaires distributed, 293 were retrieved (88.8%) and 287 were determined usable for analysis (87.0%).

1.12 Reliability and Validity

Internal consistency reliability was assessed using Cronbach's Alpha coefficient for each construct. All alpha values exceeded the widely accepted benchmark of 0.70 (Nunnally, 1978), confirming adequate internal consistency. Content validity was established through

expert review by three faculty members in Human Resource Management and Organisational Behaviour prior to instrument deployment. Convergent validity was assessed through interitem correlation matrices.

Table 1: Cronbach's Alpha Reliability Coefficients for Study Variables

S/N	Variable	No. of Items	Cronbach's Alpha (α)
1	Capacity Building	4	0.974
2	Timeliness	4	0.945
3	Quantity Output	4	0.959
4	Quality of Service	4	0.973

Source: Research Data, 2025/2026

1.13 Data Analysis Technique

Descriptive statistics (means and standard deviations) were employed to characterise the distribution of study constructs. The Spearman's Rank-Order Correlation Coefficient (ρ) was selected as the primary inferential technique, given its appropriateness for ordinal Likert-scale data and its robustness to deviations from normality — a common characteristic of workplace attitudinal survey data. All hypotheses were tested at the 0.05 level of significance. Analysis was performed using IBM SPSS Statistics Version 26.0.

RESULTS AND FINDINGS

1.14 Response Rate and Sample Description

Table 2: Distribution and Retrieval of Research Instrument

Item	Frequency	Percentage (%)
Questionnaires Distributed	330	100.0
Questionnaires Retrieved	293	88.8
Questionnaires Not Retrieved	37	11.2
Valid Questionnaires Used in Analysis	287	87.0

Source: Field Research, 2025/2026

A response rate of 87.0% is considered excellent by the standards of organisational survey research (Baruch & Holtom, 2008) and is sufficient to ensure the statistical power required for

the bivariate correlation analyses conducted. The high retrieval rate is attributed to the inperson questionnaire administration protocol employed by trained research assistants.

1.15 Descriptive Statistics

Table 3: Descriptive Statistics for Study Constructs (N = 287)

Construct	N	Mean ($\bar{x}$)	Std. Deviation
Capacity Building	287	10.63	4.008
Timeliness	287	14.03	3.892
Quantity Output	287	14.45	3.668
Quality of Service	287	15.69	3.562

Source: SPSS v26.0 Output, 2025/2026

The descriptive statistics reveal mean scores ranging from 10.63 (capacity building) to 15.69 (quality of service), all on a 5-point Likert scale aggregated across four items per construct (maximum possible score = 20). The observed standard deviations (3.56–4.01) indicate moderate variance in respondents' assessments, consistent with the heterogeneous organisational contexts represented in the sample. The mean scores, when disaggregated to per-item averages, range from 2.66 to 3.92, suggesting moderate to high levels of agreement with the construct indicators across the sample.

1.16 Bivariate Correlation Analysis and Hypothesis Testing

Table 4 presents the Spearman's Rank-Order Correlation Coefficient matrix for all study variables. The matrix reveals strong, positive, and statistically significant inter-correlations among all constructs, with p-values of 0.000 across all pairs, indicating significance at the 0.01 level (two-tailed).

Table 4: Spearman's Correlation Matrix — Capacity Building and Employee Productivity Dimensions

Variable	Capacity Building	Timeliness	Quantity Output	Quality of Service
Capacity Building	1.000	.976**	.985**	.972**
Timeliness	.976**	1.000	.972**	.967**
Quantity Output	.985**	.972**	1.000	.976**
Quality of	.972**	.967**	.976**	1.000

Service				
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**** Correlation is significant at the 0.01 level (two-tailed). Source: SPSS v26.0, 2025/2026**

Hypothesis 1 — Capacity Building and Timeliness

The Spearman correlation between capacity building and timeliness yielded $\rho = .976$ ($p = .000 < .05$). The null hypothesis (H_{01}) is therefore rejected. This finding confirms a strong, positive, and statistically significant relationship between capacity building and employee timeliness in quoted food and beverages manufacturing companies in South-South Nigeria. Organisations that invest more intensively in capacity building programmes demonstrate markedly improved employee adherence to time-based productivity standards.

Hypothesis 2 — Capacity Building and Quantity Output

The Spearman correlation between capacity building and quantity output yielded $\rho = .985$ ($p = .000 < .05$), the highest correlation coefficient observed in the study. The null hypothesis (H_{02}) is rejected. This result confirms a very strong and significant positive relationship between capacity building investment and the volume of productive output generated by employees — suggesting that the quantity dimension of productivity is the most directly and powerfully influenced by workforce development programmes among the three dimensions studied.

Hypothesis 3 — Capacity Building and Quality of Service

The Spearman correlation between capacity building and quality of service yielded $\rho = .972$ ($p = .000 < .05$). The null hypothesis (H_{03}) is rejected. This confirms a strong, positive, and significant relationship between capacity building and service quality standards. As employees develop deeper competencies through structured learning programmes, their ability to perform work that meets or exceeds quality standards is significantly enhanced — a finding with important strategic implications for quality management in the Nigerian food and beverages sector.

DISCUSSION OF FINDINGS

1.17 Empirical Findings in Context

The consistently strong and significant positive correlations observed between capacity building and all three productivity dimensions ($\rho = .972-.985$) are among the highest reported in the extant Nigerian manufacturing HR literature. These findings are broadly consistent with Yamoah and Maiyo (2013), Chukwurah and Uzor (2020), and Nwankwo et al. (2017), while extending those studies' scope by documenting the relationship across a larger, multi-organisational sample in the specific context of the South-South Nigerian food and beverages sector.

The particularly strong correlation between capacity building and quantity output ($\rho = .985$) is especially noteworthy. In the manufacturing context, output quantity is heavily conditioned by process efficiency, technical competency, and the minimisation of error-induced downtime. This finding suggests that structured capacity building — by enhancing employees' process

knowledge, technical skills, and problem-solving capabilities — directly addresses the primary determinants of manufacturing output quantity. This conclusion is consistent with the dynamic capabilities perspective: organisations that systematically build workforce competencies develop a durable advantage in transforming inputs into outputs at higher volumes.

1.18 Contemporary Implications: Digital Transformation and Capacity Building

The findings must be interpreted in light of the accelerating digital transformation of Nigeria's manufacturing sector. The strong capacity building–productivity relationship documented in this study reflects current conditions, but the composition of effective capacity building is shifting rapidly. As AI-enabled quality monitoring systems, IoT-driven production analytics, and automated inventory management become standard in Nigerian food and beverages manufacturing, the specific competencies required for high productivity are evolving. Future waves of capacity building investment must prioritise digital literacy, data interpretation skills, and AI tool proficiency alongside traditional process and product knowledge.

This argument is supported by findings from PricewaterhouseCoopers' 2024 Africa Workforce Survey, which reports that 61 percent of Nigerian manufacturing executives identify digital skills gaps as the primary threat to productivity in the coming five years — surpassing raw material cost pressures, infrastructure deficits, and regulatory uncertainty. Organisations that fail to evolve their capacity building frameworks to address these digital skill requirements risk seeing the capacity building–productivity relationship documented in this study weaken significantly in future periods.

1.19 Post-Pandemic Workforce Resilience: An Underinvested Dimension

The COVID-19 pandemic fundamentally altered the psychological landscape of the Nigerian manufacturing workforce. Teng-Calleja et al.'s (2020) finding that resilience-building programmes cascade from organisational to individual resilience has particular resonance in the South-South Nigerian context, where many manufacturing employees experienced severe economic and personal disruption during and after the pandemic period. The study's findings, showing strong capacity building–timeliness correlations, may partly reflect the motivational and confidence-building effects of structured development programmes — effects that are directly relevant to resilience-oriented capacity building interventions.

Organisations in the sector are strongly encouraged to integrate psychological capital development — including resilience training, mental health support, and growth mindset cultivation — as a deliberate dimension of their capacity building programmes. Evidence from South African FMCG manufacturers suggests that psychologically-focused capacity building interventions yield a 19 percent improvement in timeliness-related productivity metrics over 12 months, primarily through reduced absenteeism and enhanced motivational engagement (Van den Berg & Venter, 2023).

1.20 Knowledge Management as a Productivity Multiplier

The strong inter-correlations observed between all three productivity dimensions ($\rho = .967-.976$) suggest that capacity building's effects on productivity are systemic rather than dimension-specific. This finding supports the argument that effective capacity building operates through an organisational knowledge ecosystem: as employees develop competencies through structured programmes, this knowledge is shared, institutionalised, and multiplied across the organisation — improving not just the individual dimensions of timeliness, quantity, and quality but the overall productive capability of the workforce. For organisations to realise the full multiplier effect of their capacity building investments, deliberate knowledge management systems — including communities of practice, digital knowledge repositories, and after-action review protocols — must be in place to capture and diffuse what is learned.

"The most important insight from this study may be this: capacity building does not improve productivity in isolation — it improves the organisation's capacity to learn, adapt, and perform. Building that capacity in the digital age requires a deliberate expansion of what we understand capacity building to mean."

CONCLUSION AND RECOMMENDATIONS

1.21 Conclusion

This study has provided robust empirical evidence confirming strong, positive, and statistically significant relationships between capacity building and all three dimensions of employee productivity — timeliness, quantity output, and quality of service — in quoted food and beverages manufacturing companies in South-South Nigeria. These findings validate the theoretical propositions of Social Learning Theory, Dynamic Capabilities Framework, and the Technology Acceptance Model as applied to the HR development–productivity nexus in the emerging economy manufacturing context.

Beyond reaffirming the fundamental importance of workforce investment, this paper has argued that the evolving demands of Industry 4.0, post-pandemic workforce reconfiguration, and digital transformation require a substantive evolution of capacity building frameworks. Traditional modalities — while still valuable and empirically productive as demonstrated by this study — must be systematically augmented by digital upskilling programmes, AI-assisted personalised learning platforms, psychological resilience interventions, and knowledge management ecosystems. Organisations that make this transition proactively will sustain and strengthen the capacity building–productivity relationship documented here; those that do not risk falling progressively behind in an increasingly competency-driven competitive environment.

1.22 Recommendations

Institutionalise Digital Upskilling as a Core Capacity Building Dimension: HR managers in food and beverages manufacturing firms should develop structured digital competency frameworks that map the digital skills required at each role level and design targeted capacity building pathways to close identified gaps. Investment in accessible, mobile-friendly learning management systems is especially critical given Nigeria's high mobile penetration rates and the geographic dispersal of manufacturing workforces.

Deploy AI-Assisted Personalised Learning Platforms: Organisations should evaluate and adopt AI-adaptive learning platforms that personalise training content based on individual learner performance data. These platforms have demonstrated significantly higher learning efficiency compared to standardised training programmes and are increasingly available at cost points accessible to mid-sized Nigerian manufacturers through cloud-based subscription models.

Integrate Psychological Resilience Training into Capacity Building Programmes: Given the documented impact of post-pandemic psychological disruption on workforce productivity, HR departments should incorporate PsyCap development — encompassing resilience, self-efficacy, hope, and optimism — as a structured element of capacity building. This can be achieved through facilitated resilience workshops, peer support networks, and integration of wellbeing dimensions into performance development conversations.

Establish Knowledge Management Systems to Multiply Capacity Building Returns: Organisations should invest in digital knowledge repositories, communities of practice, and structured knowledge transfer mechanisms that capture competencies developed through training and disseminate them across the workforce. This is particularly important in sectors characterised by moderate to high employee turnover, where individual knowledge attrition represents a significant productivity risk.

Align Capacity Building Strategies with Industry 4.0 Adoption Roadmaps: Senior management and HR leadership should co-develop capacity building strategies that are explicitly aligned with the organisation's technology adoption roadmap. As automation, IoT monitoring, and AI-driven analytics are integrated into manufacturing operations, corresponding competency development programmes must be in place before — not after — technology deployment to minimise productivity disruption during transition periods.

Pursue Cross-Sector Industry Partnerships for Capacity Building Efficiency: Individual food and beverages companies, especially smaller quoted firms, should explore industry association-based capacity building consortia that pool resources for shared training infrastructure, including digital learning platforms, industry-specific simulation environments, and guest faculty networks. Such collaborative models can dramatically increase the cost-effectiveness and reach of capacity building investment across the sector.

1.23 Limitations and Directions for Future Research

This study is subject to several limitations that should inform future research. First, the cross-sectional design precludes causal inference; longitudinal designs are needed to establish the temporal dynamics of the capacity building–productivity relationship. Second, the study's

focus on quoted companies in South-South Nigeria limits generalisability to unquoted firms, other regions of Nigeria, and other sectors. Third, the questionnaire methodology is susceptible to common method variance and social desirability bias; future studies should supplement survey data with objective productivity metrics and managerial observation data. Finally, this study did not measure the specific content or quality of capacity building programmes — a critical variable for understanding the conditions under which capacity building yields the strongest productivity returns.

Future research directions include: (i) longitudinal multi-wave studies tracking capacity building investment and productivity outcomes over 3–5 year periods; (ii) comparative studies examining the relative productivity impacts of digital versus traditional capacity building modalities; (iii) mixed-methods investigations combining quantitative correlation analysis with qualitative exploration of the mechanisms linking capacity building to productivity in Nigerian manufacturing contexts; and (iv) cross-sectoral studies examining whether the capacity building–productivity relationships documented here hold in other Nigerian manufacturing subsectors, including petroleum services, agro-processing, and pharmaceuticals.

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