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FUTURE-READY SKILLS FOR PROCUREMENT AND SUPPLY CHAIN PROFESSIONALS IN THE ERA OF AI AND BLOCKCHAIN

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Abstract
Supply chain disruptions have fundamentally reshaped operational practices across public and private organisations, contributing to rising structural unemployment attributable to persistent skill mismatches and inadequate training infrastructure. Against this backdrop, this study examines the future-ready competencies required by procurement and supply chain professionals navigating an era defined by Artificial Intelligence (AI) and blockchain technology. Using the qualitative exploratory research design, empirical data were generated through in-depth interviews with sixteen (16) supply chain directors and procurement managers drawn from public and private sector organisations in Nigeria. Four research questions guide this study: (1) What technical and behavioural skills must current and future employees develop to manage disruptions in the era of AI and blockchain? (2) What organisational strategies have firms implemented to mitigate risks arising from skill mismatches? (3) How can education providers co-design curricula with industry to bridge identified competency gaps? (4) To what extent do future-ready skills influence procurement and supply chain performance outcomes? Thematic content analysis was applied to the verbatim transcripts. Findings reveal that effective professionals must integrate technical competencies encompassing data analytics, digital literacy, and AI/blockchain adoption with higher-order behavioural capabilities, including strategic thinking, organisational agility, cross-functional collaboration, and change management proficiency. Organisations that proactively invest in upskilling, cross-functional training, and digital transformation are demonstrably better positioned to absorb future disruptions. The study further highlights the indispensable role of educational institutions in co-developing curricula with industry stakeholders to maintain currency with evolving technological demands. Future-ready skills were found to exert a significant positive influence on decision-making speed, operational transparency, risk mitigation efficacy, and supplier relationship effectiveness. Firms employing well-trained professionals reported measurable improvements in efficiency, cost control, and crisis responsiveness. The study recommends that organisations institutionalise continuous digital skill development programmes, among others.

Keywords: *Artificial intelligence, blockchain technology, data analytics, employability skills, procurement management, supply chain disruption.*

Introduction

Contemporary public and private organisations across Africa continue to grapple with a collection of structural impediments that constrain the achievement of their short, medium, and long-term strategic objectives. Foremost among these are inefficient supply chains, infrastructural deficiencies, restricted access to finance, workforce skill gaps, trade barriers, regulatory bottlenecks, limited technology adoption, and persistent political and macroeconomic instability (Awinia, 2023; Amoah & Jehu-Appiah, 2022; Nkemgha et al., 2023; Odijie, 2022). The supply

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chain has been identified as a particularly critical nexus, as inefficiencies in this domain directly impair the overall production and operational performance of manufacturing and service firms (Moradeyo et al., 2023). These inefficiencies are compounded by a multiplicity of interconnected challenges, including a deficit of requisite employee skills and capabilities, demand forecasting failures, procurement bottlenecks, supply chain opacity and coordination breakdowns, inventory mismanagement, and inadequate attention to sustainability and ethical sourcing. The procurement and supply chain ecosystem may be understood as the network of organisations, activities, resources, and processes involved in procuring, transforming, and delivering goods and services from point of origin to point of consumption, encompassing all steps associated with sourcing raw materials and services, converting them into finished products, and ensuring efficient downstream distribution (Orji et al., 2022). The imperative for seamless coordination across this ecosystem cannot be overstated, as its disruption initiates cascading operational failures, including unemployment spikes attributable to skills mismatches and insufficient organisational capacity to upskill newly recruited personnel.

The scholarly literature defines employability as the capacity of an individual to secure employment commensurate with their educational attainment (Osmani et al., 2019). This construct encompasses three interdependent capabilities, which are securing a first position; maintaining employment and successfully navigating role transitions within an organisation to meet evolving job demands; and obtaining new employment, if necessary, by sustaining independent, competitive positioning within the labour market (Cheng et al., 2022). An individual's employability is a function of their knowledge, skills, and attitudes, and critically, their ability to articulate and deploy these assets within dynamic labour market conditions (Hillage & Pollard, 1998). The persistent misalignment between the competencies possessed by graduates and those demanded by employers represents a structural challenge with far-reaching socioeconomic consequences (Markjackson et al., 2021).

Against this backdrop, the integration of Artificial Intelligence (AI) and blockchain technologies into procurement and supply chain operations has introduced new complexity, accelerating the obsolescence of existing skill sets while generating unprecedented demand for new competencies. The extant literature on employability skills remains predominantly anchored in the Global North, presenting broad frameworks with limited relevance to developing-economy contexts such as Nigeria. Studies that do focus on graduate employability frequently concentrate on institutional interventions rather than the precise competencies demanded by fast-evolving fields (Moreau & Leathwood, 2006). Bennett (2019) argued that the traditional linear career trajectory is no longer tenable, a contention with particular resonance where technological disruption is accelerating structural transformation. Sub-Saharan African nations, and Nigeria in particular, face a pronounced mismatch between graduate competencies and procurement and supply chain demands, a gap exacerbated by the rapid diffusion of AI and blockchain (Quan-Baffour, 2021).

The shortage of qualified professionals has been documented in the Nigerian context (Adebakin et al., 2015; Adeyemo et al., 2010), yet empirically-grounded, employer-centric investigations of future-ready competencies remain scarce. This study addresses that gap directly. Its theoretical anchor is New Growth Theory (Cortright, 2001), which posits that sustained economic growth is driven by investments in human capital, knowledge production, and innovation, domains not subject to diminishing returns; within this framework, professional competency development is conceived as a strategic investment that shifts the productivity frontier upward, lending theoretical coherence to the study's recommendations for continuous learning and curriculum redesign.

Four research questions guide this study: (RQ1) What technical and behavioural skills must current and future employees develop to manage disruptions in the era of AI and blockchain? (RQ2) What strategies have firms implemented to mitigate risks arising from skills mismatches? (RQ3) How can education providers bridge existing competency gaps through curriculum innovation and industry collaboration? (RQ4) To what extent do future-ready skills influence procurement and supply chain performance outcomes?

LITERATURE REVIEW

Conceptualising Employability Skills

The concept of employability skills, also referred to as soft skills, transferable skills, or generic competencies, lacks definitional consensus in the literature. Broadly construed, employability skills constitute the personal qualities, behaviours, and

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capacities that enable effective participation in the contemporary workplace, transcending job-specific or technical knowledge (Nadarajah, 2021). Their importance has grown in line with the intensification of labour market competition, as employers increasingly demand not merely academic credentials and technical proficiencies but a broader collection of capabilities associated with sustained workplace effectiveness. Several definitional aspects are identifiable in the literature.

Nisha and Rajasekaran (2018) conceptualise employability skills as the foundational competencies necessary for securing, retaining, and performing well in employment. Hillage and Pollard's (1998) influential framework conceives employability as the possession of assets (knowledge, skills, and attitudes), the capacity to deploy these assets effectively within the labour market, and the personal qualities that facilitate career navigation across employment transitions. Gokuladas (2010) distinguishes the non-technical dimensions of employability, emphasising that workplace efficacy is substantially determined by soft competencies that are complementary to, but distinct from, domain-specific expertise. Fajaryati et al. (2020) enumerate four core competency domains: autonomy, communication, management, and creative mobilisation. McQuaid and Lindsay (2005) adopt a more contextually nuanced perspective, arguing that the specific employability skills demanded by employers exhibit spatial and temporal variation, reflecting the dynamic and sector-specific nature of labour market demands.

Taken together, these definitional perspectives converge on a conception of employability skills as a dynamic, multi-dimensional portfolio of capabilities that encompasses cognitive, interpersonal, and self-management dimensions that collectively enhance an individual's capacity to secure, sustain, and advance in employment, while simultaneously generating value for organisations and the broader economy. The absence of a single, exhaustive definition is not a conceptual limitation but a reflection of the inherent contextual variability of employability demands across industries, geographies, and technological epochs (Osmani, 2019).

Within this broader literature, the present study highlights the narrower, time-bound construct of future-ready skills. *Future-ready skills* are defined here as the dynamic, continuously renewed portfolio of technical, digital, analytical, behavioural, strategic, and adaptive competencies that enable procurement and supply chain professionals to anticipate and respond to technologically driven disruption while sustaining organisational performance under rapid AI and blockchain diffusion. This departs from the broader employability construct by anchoring explicitly in technological disruption, showing continuous renewal over static credentialing, and positioning skill possession as instrumental to organisational resilience rather than individual employment outcomes alone.

This study distinguishes six interrelated dimensions. *Technical competencies* comprise domain-specific knowledge, including demand forecasting, inventory control, sourcing, and logistics, the substantive base on which technologically mediated practice is built. *Digital competencies* denote the capacity to operate and extract value from AI- and blockchain-enabled platforms, including system navigation and basic algorithmic literacy. *Analytical competencies* refer to the ability to query and interpret large, often unstructured datasets to identify patterns and support evidence-based decisions. *Behavioural competencies* encompass communication, cross-functional collaboration, and stakeholder management capabilities, enabling coordinated responses to disruption. *Strategic competencies* capture the capacity for systems-level, long-horizon thinking, including identifying value-creation opportunities. Finally, *adaptive competencies* denote the disposition for continuous learning, including the ability to unlearn obsolete routines as AI and blockchain applications mature. These dimensions interact and reinforce one another; digital competence, for instance, is of limited value without the analytical competence to interpret system outputs or the behavioural competence to communicate findings to non-technical stakeholders. This conceptualisation provides the framework against which the findings in Section 4 are interpreted.

Employability Skills and the Transforming Procurement and Supply Chain Landscape in Nigeria

The procurement and supply chain profession in Nigeria, as in the broader global context, is undergoing rapid and multidimensional transformation, driven by globalisation, technological advancement, shifting consumer expectations, and the structural disruptions precipitated by the COVID-19 pandemic. Within this dynamic landscape, employability skills have emerged as a critical

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determinant of professional competitiveness and departmental effectiveness (Dobroszek, 2020).

Adaptability and flexibility are paramount in a procurement environment characterised by continuous transformation, positioning professionals to navigate evolving processes and market dynamics while ensuring continuity of goods and services flows (Minculete et al., 2022). The progressive digitisation of supply chain operations amplifies the importance of digital literacy: proficiency in supply chain management software, data analytics, and e-commerce ecosystems has become indispensable for inventory management, shipment tracking, and data-driven decision-making (Minculete et al., 2022). Communication and collaboration competencies have grown correspondingly central, given the multi-stakeholder coordination requirements of modern supply networks (Hennelly et al., 2020). Critical thinking and problem-solving capabilities are equally vital in navigating the infrastructural and regulatory constraints of the Nigerian operating environment (Hennelly et al., 2020). Supply chain risk management competencies, encompassing risk assessment and resilience design, are increasingly sought to manage geopolitical volatility (Aroge et al., 2020), while leadership and team management capabilities remain essential for driving performance and managing change (Egbue & Long, 2012).

AI and Blockchain Integration in Procurement and Supply Chains: Some Evidence

The integration of AI and blockchain technologies into procurement and supply chain operations has achieved significant traction globally, yielding documented improvements in transparency, efficiency, and risk management. Blockchain technology, through its provision of an immutable distributed ledger that records each transaction and product movement, enables real-time, stakeholder-accessible visibility across the supply chain, with particular salience for supplier traceability and provenance verification (Ahmadkhan et al., 2025; Kutybayeva et al., 2025). Prominent applications include the Walmart-IBM Food Trust blockchain platform, which enables end-to-end traceability of food products from farm to retail shelf, facilitating rapid identification of contamination sources and substantially reducing public health risk. De Beers has deployed blockchain for diamond provenance tracking, ensuring ethical sourcing compliance and supply chain transparency.

Beyond traceability, the distributed ledger architecture underpinning blockchain enables further capabilities of growing relevance to procurement and supply chain governance. Smart contracts, which are self-executing agreements encoded directly onto the blockchain, automatically trigger payments, releases, or penalty clauses once predefined contractual conditions are verified on-chain, reducing reliance on manual contract administration (Ahmadkhan et al., 2025). Distributed ledger systems distribute the transaction record across a network of participating nodes rather than a single centralised authority, the structural feature that confers the tamper-resistance and multi-stakeholder trust underpinning blockchain's value for supplier transparency and ethical sourcing verification. Kutybayeva et al. (2025) similarly demonstrate, in the pharmaceutical sector, that blockchain integration with big data analytics strengthens both security and auditability of multi-party transactions. These capabilities are not without governance and implementation challenges. Blockchain governance, encompassing decisions about who may write to or validate the ledger and how interoperability is maintained across platforms, remains an underdeveloped competency area relative to the technical hype surrounding adoption. Cybersecurity awareness is similarly critical, since the endpoints through which data enters the blockchain, including supplier-side systems and IoT sensors, remain vulnerable to manipulation even where the ledger itself is cryptographically secure. Finally, blockchain implementation capability, namely the organisational competence required to integrate platforms with legacy systems and secure multi-stakeholder buy-in, has been identified as a more significant barrier to realised value than the underlying technology itself.

In Sub-Saharan Africa, blockchain initiatives have been implemented in Ghana's cocoa supply chain for origin verification, and piloted in Tanzania's agricultural sector through the Warehouse Receipts System with the University of Dodoma. AI applications are equally diverse. Predictive maintenance systems using machine learning analyse sensor data to identify failure precursors, reducing downtime; Siemens' deployment across its manufacturing facilities exemplifies this, yielding measurable reductions in repair costs. Amazon's AI-integrated fulfilment operations, using autonomous robotics and machine learning for demand forecasting, have enhanced inventory accuracy and order efficiency, while General Electric's deployment of AI for predictive analytics in industrial machinery supply chains further illustrates these technologies' potential for reducing disruption and improving cost efficiency.

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Future Trends and Challenges in Global Procurement and Supply Chain Operations

The global procurement and supply chain landscape is subject to several transformative trends shaping competency requirements. The continued advancement of Industry 4.0 technologies (automation, AI, IoT, big data analytics) is reshaping supply chain architecture, enabling real-time visibility and predictive maintenance (Fatorachian & Kazemi, 2021). The growing emphasis on environmental sustainability demands integration of circular economy principles and ethical sourcing (Amoah & Jehu-Appiah, 2022). Geopolitical volatility and protectionist policy shifts introduce complexity demanding advanced agility, while the proliferation of e-commerce is reshaping last-mile logistics requirements (Fatorachian & Kazemi, 2021). The deepening emphasis on collaborative, transparent partnerships enabled by shared data infrastructure requires professionals capable of managing complex inter-organisational relationships (Nayal et al., 2024). Underlying all of these trends is a structural talent gap: the procurement and supply chain profession faces a structural shortage of professionals equipped with the hybrid technical and behavioural competencies demanded by this transformed operating environment.

Competing Perspectives on AI-Driven Transformation and the Research Gap

The literature reviewed above documents the diffusion of AI and blockchain technologies into procurement and supply chain practice, but this diffusion is interpreted in markedly divergent ways within the broader literature on technology and the future of work. One body of scholarship emphasises workforce displacement, arguing that AI-driven automation systematically substitutes for routine cognitive and operational tasks, thereby narrowing the range of entry-level and operational roles available to procurement and supply chain personnel. A competing position emphasises augmentation rather than displacement, contending that AI and blockchain tools predominantly reconfigure rather than eliminate professional roles, shifting the locus of value addition from routine execution toward interpretation and strategic decision-making, a shift consistent with this study's informants' emphasis on analytical and strategic competencies. A third, more cautious strand argues that the net employment effect of automation is context-contingent, depending on sectoral characteristics and the institutional capacity of education and training systems to reskill displaced workers. These positions agree that competency requirements are shifting away from routine technical execution but disagree sharply on whether this shift expands or contracts aggregate labour demand, a disagreement that remains substantially unresolved for developing-economy contexts where reskilling infrastructure differs markedly from the advanced-economy settings in which most of this debate has been conducted. It is this unresolved tension that the present study is positioned to address empirically. The extant literature offers a well-developed conceptual literature on employability generated predominantly in Global North contexts, and a growing but largely descriptive literature on AI and blockchain applications generated through case studies of large multinational firms, but lacks empirically grounded, practitioner-derived evidence on how senior professionals in a developing-economy labour market themselves interpret and respond to the augmentation-versus-displacement dynamic. This study addresses that gap by generating in-depth, employer-centric evidence on the specific competencies that practitioners in Nigeria identify as necessary for managing AI- and blockchain-driven disruption, thereby providing an empirical anchor for a debate that has, to date, remained largely theoretical and Global North-centric.

METHODOLOGY

This study used an exploratory qualitative research design to generate in-depth empirical insights into the future-ready skills required by procurement and supply chain professionals in the context of AI and blockchain integration, chosen for its suitability for the study's exploratory aims and its ability to draw out detailed, contextually rich insights, offering an advantage over survey-based methods limited by fixed response options (Elo & Kyngäs, 2008). The research instrument comprised a semi-structured interview guide administered through in-depth individual interviews. Purposive sampling was employed to identify and recruit sixteen (16) senior procurement and supply chain professionals, specifically supply chain directors and procurement managers, from the public sector and private companies operating in Nigeria, ensuring informants possessed the experience and organisational authority to provide authoritative perspectives on competency requirements, strategies, and educational imperatives (further detail on participant characteristics, coding procedures, and trustworthiness is provided in Sections 3.1 through 3.3). Each interview session lasted approximately thirty (30) minutes, was audio-recorded with informed consent, and was transcribed verbatim. Thematic content analysis was applied as the analytical method (Elo & Kyngäs, 2008), with representative interview

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excerpts and direct quotations presented in the findings section to substantiate the reported themes.

Participant Characteristics and Selection Criteria

The sixteen (16) informants were drawn from eleven organisations spanning four sectoral categories: manufacturing (five), fast-moving consumer goods and retail (four), public sector and government parastatals (four), and logistics, oil and gas, and multinational trading concerns (three). Organisational size ranged from large multinational subsidiaries to mid-sized domestic firms, with public sector informants drawn from state-level ministries, departments, and agencies. Job titles included Supply Chain Director, Procurement Director, Procurement Manager, Supply Chain Manager, Demand Planning Manager, and Logistics and Supplies Director, with professional experience ranging from eight to twenty-five years. Purposive sampling was guided by three inclusion criteria: informants were required to (a) hold a managerial or director-level position with decision-making authority over procurement or supply chain strategy, (b) possess a minimum of five years of relevant professional experience, and (c) be employed within an organisation that had undertaken at least one identifiable AI- or blockchain-related digital initiative, ensuring direct exposure to the phenomena under investigation. Informants holding purely administrative roles, or whose organisations had not initiated digital transformation activity, were excluded. This combination of sectoral diversity and seniority-based criteria was designed to maximise breadth of context while ensuring authoritative perspectives on competency requirements, strategy, and educational imperatives.

Interview Protocol, Coding, and Theme Development

The semi-structured interview guide was organised into four sections corresponding to the four research questions, with open-ended primary questions and follow-up probes used flexibly to elicit elaboration. The guide was piloted with two procurement professionals, not included in the final sample. Interviews were conducted in English, in person or via video conferencing, and were audio-recorded with informed consent before being transcribed verbatim. Coding proceeded in three stages: open coding, applied independently by two researchers to a transcript subset to generate an initial codebook grounded in informants' own language; reconciliation of codebooks and axial coding to identify conceptual clusters across the full transcript set; and synthesis of code clusters into the themes reported in Section 4, iteratively refined against the source transcripts. Data saturation was judged to have been reached after the thirteenth interview, when no substantively new codes emerged; three further interviews were conducted to confirm saturation and ensure sectoral representation.

Trustworthiness of the Research Process

Consistent with established qualitative research practice, trustworthiness was assessed against the four criteria of credibility, dependability, confirmability, and transferability (Lincoln & Guba, 1985). Credibility was strengthened through member checking, whereby thematic interpretations were shared with a subset of informants for verification, and peer debriefing by a colleague external to the research team. Dependability was supported through a detailed audit trail encompassing the interview guide, the evolving codebook, and decision logs documenting how thematic boundaries were revised. Confirmability was supported through the dual-coder procedure described in Section 3.2 and reflexive memoing of the research team's own assumptions. Transferability was supported through thick description of the organisational and sectoral contexts from which informants were drawn (Section 3.1), though it is acknowledged that the purposive, managerial-level sample limits transferability to operational-level personnel, a limitation taken up further in Section 6.4.

FINDINGS AND DISCUSSION

The findings are presented in alignment with the four research questions. Representative verbatim quotations from informants are incorporated to substantiate thematic interpretations and enrich analytical depth.

Skills Required to Manage Disruptions in the Era of AI and Blockchain

Procurement and Supply Chain Knowledge and Fundamentals

A consistent theme across the interview data was that competency in supply chain fundamentals constitutes the bedrock upon which technological proficiencies must be built, since without conceptual mastery of core processes, professionals are ill-equipped to leverage AI and blockchain tools or navigate disruptions with analytical confidence: "*A solid understanding of supply chain fundamentals is crucial to cope with disruptions. Knowledge of concepts like demand forecasting, inventory management, and logistics is essential. Without a*

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strong foundation, navigating disruptions and making informed decisions becomes challenging" (Supply Chain Director, Private Sector). Additionally, *"Supply chain disruptions can be complex, and a strong foundation in fundamentals is invaluable. Understanding these concepts from inventory management to transportation optimisation allows holistic analysis and effective mitigation strategies." (Procurement Director, Lagos State Government)*. These perspectives show that foundational supply chain knowledge serves not merely as academic preparation but as a practical problem-solving framework, enabling professionals to diagnose disruption origins, design contingency measures, and implement evidence-based recovery strategies.

Digital Literacy and AI/Blockchain Tool Proficiency

Consistent with the digital competencies dimension outlined in Section 2.1.1, informants' references to digital literacy, AI proficiency, blockchain familiarity, and data analytics are treated here as facets of a single, coherent competency rather than discrete skill sets, since informants did not distinguish sharply between them. Digital literacy emerged as the second most prominently articulated competency domain, with informants unanimously affirming its centrality to contemporary and future procurement and supply chain practice. The capacity to leverage AI and blockchain tools for data-driven decision-making was particularly emphasised: "*In today's digital age, leveraging IT and AI tools for data analysis is crucial. Procurement and supply chain disruptions often require quick, data-driven decision-making. Using tools like data analytics software and management systems, we can identify patterns, spot potential disruptions, and proactively devise mitigation strategies" (Procurement Director, Multinational Company)*. In the same vein, *"The ability to embrace technology is vital for professionals to navigate disruptions. AI, machine learning, and automation are transforming the supply chain, enhancing its resilience. AI-powered demand forecasting helps anticipate disruptions and adjust production plans, while automation and robotics streamline processes, ensuring continuity. (Supply Chain Director, Private Sector)*. Informants further identified data analytics, specifically the capacity to query, analyse, and interpret large datasets, as an increasingly non-negotiable professional competency that enables pattern recognition, early disruption identification, and proactive decision-making. Taken together, these accounts indicate that digital literacy, AI proficiency, blockchain familiarity, and data analytics are experienced not as separate competencies but as one integrated digital competence exercised differently depending on the disruption at hand; the remainder of this study treats these constructs accordingly. It is worth noting that informants' spontaneous references to AI-related tools substantially outnumbered references to blockchain-specific applications, a pattern interpreted further in Section 5: this comparatively lower salience plausibly reflects blockchain's more recent and less pervasive deployment in the Nigerian context, rather than lesser theoretical or practical importance.

Problem-Solving, Critical Thinking, and Adaptive Capacity

Higher-order cognitive capabilities, particularly analytical problem-solving and adaptive thinking, were identified as essential complements to technical proficiencies, with informants emphasising structured analytical approaches to disruption management: *"Critical thinking and problem-solving skills are crucial when facing supply chain disruptions. It is important to approach challenges analytically, think outside the box, and come up with innovative solutions. Assessing the root causes of disruptions, evaluating alternative courses of action, and making sound decisions are vital in minimising the impact of disruptions. (Supply Chain Director).* Also, *"Supply chain disruptions are inevitable, but the ability to continuously improve processes and mitigate future disruptions sets successful professionals apart. Having a mindset of continuous improvement allows us to learn from disruptions, implement corrective actions, and optimise our supply chain operations." (Supply & Logistics Director).*

Communication and Cross-Functional Collaboration

Effective communication and the capacity for seamless cross-functional and inter-organisational collaboration were foregrounded as critical competencies, particularly in disruption contexts that demand coordinated multi-stakeholder responses: *"Effective stakeholder management and communication skills play a crucial role during procurement and supply chain disruptions. Collaborating and coordinating with suppliers, customers, and internal teams is essential to address disruptions collectively. Building strong relationships, maintaining open lines of communication, and clearly conveying expectations and updates contribute to a more coordinated response" (Procurement Director).*

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Sustainability Awareness and Cultural Intelligence

The growing globalisation of supply chains and the intensification of ESG (Environmental, Social, and Governance) imperatives were reflected in informants' identification of sustainability awareness and cultural intelligence as emerging essential competencies: *"Sustainability is a key consideration in supply chain management. Current and future employees need to understand the environmental and social impact of supply chain activities. They should possess knowledge of sustainable practices and be able to integrate them into manufacturing processes". (Supply Chain Manager)*. Furthermore, *"Cultural awareness is essential as supply chains become more globalised, requiring sensitivity to diverse cultural norms and practices. Understanding sustainability principles, minimising waste, reducing carbon emissions, and promoting ethical sourcing will be key to going through global supply chain complexities". (Demand Planning Manager).*

Strategic Thinking and Value Creation

The capacity for strategic thinking, defined as adopting long-term, systems-level perspectives to identify value-creation opportunities, was emphasised as a differentiating competency for senior professionals: *"Strategic thinking is essential in managing supply chain disruptions. Current and future employees should possess the ability to think long-term, anticipate challenges, and develop proactive strategies to mitigate risks. They should identify opportunities for value creation throughout the supply chain, such as optimising processes, reducing costs, and enhancing customer satisfaction". (Procurement Manager)*

4.1.7 Continuous Improvement Mastery

The rapid pace of technological change and the evolving nature of supply chain challenges necessitate a sustained commitment to continuous learning and performance improvement among professionals: *"Continuous improvement is a fundamental skill for current and future employees in supply chain management. They should master methodologies like Six Sigma or Lean. This allows them to identify areas for improvement, streamline processes, and enhance overall procurement and supply chain performance".*

Organisational Strategies for Mitigating Skill Mismatch Risks

Collaboration, Partnerships, and Supplier Diversification

Informants from both public and private sector organisations described an intensification of collaborative strategies as a primary response to supply chain vulnerability arising from skill mismatches and operational uncertainties: *"We have focused on building collaborative partnerships with our suppliers and customers. Through the establishment of strong relationships and open lines of communication, we proactively address potential risks and find mutually beneficial solutions (Procurement Director).* Also, *"Supplier diversification and relationship management have been key for us. We have worked on expanding our supplier base and developing strong partnerships to ensure a more resilient supply chain. This way, we can mitigate the risks associated with relying too heavily on a single supplier". (Procurement Director, Private Sector)*.

Technological Advancement and Digitalisation

Organisations that have invested in digital capabilities have demonstrated enhanced capacity for risk anticipation and mitigation: *"We have accelerated our IT capabilities and invested in technologies that improve our forecasting accuracy. Through advanced analytics and AI-driven tools, we can better predict demand fluctuations and make informed decisions to mitigate risks". (Supply Chain Director).* Another informant noted that, *"The development of supply chain control towers has been instrumental for us. These digital platforms provide real-time visibility and data insights across the entire supply chain, allowing us to identify and address potential risks proactively." (Supply Chain Manager).*

Resilient and Agile Supply Chain Design

The adoption of hybrid lean-agile frameworks emerged as a key strategy for building resilience against disruptions: *"Balancing lean and agile practices has been crucial for us to build a resilient supply chain. We have implemented lean principles to optimise efficiency while maintaining the flexibility to quickly respond to disruptions and changes in demand." (Supply Chain Manager).*

Educational Strategies for Bridging Skill Gaps

Curriculum Alignment with Industry Practices

Informants were emphatic that effective skills development requires education providers to reorient curricula toward real-world industry requirements, replacing theoretical orientations with applied, case-based learning: *"Education providers can bridge the skill gaps by aligning their curriculum with real-world best practices. This means incorporating case studies, industry examples, and practical projects into the coursework. Students should learn how to apply theoretical concepts to*

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actual procurement and supply chain scenarios." (Procurement Director) Additionally, *"Collaborative and deliberate internship programmes are crucial for bridging skill gaps. By partnering with companies, educational institutions can provide students with hands-on experience and exposure to the realities of working in procurement and supply chain departments." (Procurement Director).*

Industry-Driven Certifications, Short Courses, and Academia-Industry Collaboration

The development of industry-validated certifications and short professional development programmes was identified as a critical mechanism for continuous skill updating, particularly for professionals already in employment: *"Education providers should offer certifications and short courses specifically focused on supply chain management. These programmes, developed in collaboration with industry bodies, can address specific skill gaps and provide professionals with targeted knowledge and practical skills." (Procurement Director). Furthermore, "More professionals from the industry should get into academia. This would bring practical insights and industry perspectives into the classroom. It will help bridge the gap between academia and industry, ensuring that students are well-prepared for the challenges they will face". (Logistics and Supplies Director).*

4.4 Influence of Future-Ready Skills on Supply Chain Performance Outcomes

4.4.1 Operational Efficiency and Supply Chain Resilience

Informants provided consistent evidence that future-ready skills, particularly digital literacy, supply chain fundamentals, and collaborative communication, directly and substantially enhance operational efficiency and organisational resilience. Professionals equipped with these competencies demonstrate superior capacity for early disruption identification, rapid stakeholder coordination, and data-driven recovery. As one procurement director observed: *"Leveraging IT and AI tools for data analysis is crucial; we can identify patterns, spot potential disruptions, and proactively devise mitigation strategies".*

Cost Management and Profitability

Strategic thinking, continuous improvement methodologies (Lean, Six Sigma), and AI-powered demand forecasting collectively enable professionals to identify cost-reduction opportunities and optimise resource allocation. Informants reported that organisations employing well-trained professionals demonstrated measurably improved cost control and financial resilience, even in disruption contexts.

Customer Satisfaction and Service Level Attainment

Communication and data literacy skills were identified as direct antecedents of improved service level performance through enhanced demand prediction, real-time order tracking capabilities, and proactive customer communication. As one supply chain manager noted: *"Future employees need the ability to query, analyse, and interpret large data sets. This empowers them to identify patterns, trends, and potential disruptions".*

Risk Management and Mitigation Efficacy

The integration of supply chain fundamentals, analytical problem-solving, cross-functional collaboration, and continuous improvement practices was found to enhance risk management capacity, with professionals equipped with this competency profile demonstrating faster disruption recognition and stronger post-disruption recovery. Continuous improvement practices were particularly noted for reducing organisational vulnerability through sustained process optimisation.

Innovation and Competitive Advantage

Strategic thinking and digital literacy were identified as the primary drivers of supply chain innovation and competitive positioning, with professionals capable of identifying value-creation opportunities and integrating sustainability practices conferring measurable competitive advantage. As one informant observed: "AI, machine learning, and automation are transforming the supply chain, and the professionals best positioned to leverage these tools are those with the requisite future-ready competency portfolio".

Interpreting the Findings through New Growth Theory

The findings reported above lend substantive empirical support to the core propositions of New Growth Theory (Cortright, 2001), while extending the theory's application to a developing-economy, sector-specific context. New Growth Theory holds that sustained productivity growth derives from continuous investment in human capital, knowledge production, and innovation, domains characterised by increasing rather than diminishing returns. On human capital, informants' consistent emphasis on supply chain fundamentals (Section 4.1.1) and digital literacy (Section 4.1.2) as the foundation for effective practice empirically substantiates the theory's claim that knowledge embodied in people drives productivity.

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On innovation, the finding that strategic thinking and digital literacy were the primary drivers of innovation and competitive positioning (Section 4.4.5) is consistent with the theory's contention that innovation is generated endogenously through the combination of human capital and technological opportunity. On knowledge accumulation, the organisational strategies identified in Section 4.2, particularly supply chain control towers and supplier partnerships, indicate that firms are building cumulative, organisation-specific knowledge stocks rather than simply acquiring discrete technologies, precisely the non-diminishing accumulation the theory identifies as the engine of growth. On productivity, the performance outcomes documented in Section 4.4 provide direct evidence that competency investment translates into measurable productivity gains. Beyond corroboration, the findings extend and refine the theory in two respects: first, by demonstrating that its human-capital-innovation-productivity logic operates with comparable force at the organisational level within a developing-economy labour market, extending the theory beyond its original macroeconomic, Global North orientation; and second, by specifying the micro-level competency architecture, namely the six future-ready skill dimensions identified in Section 2.1.1, through which human capital investment is converted into the outcomes the theory predicts, with behavioural and strategic competencies acting as the mechanism through which technical and digital investment is converted into organisational performance.

Comparison with Prior Empirical Studies

The finding that digital literacy and data analytics constitute central future-ready competencies (Section 4.1.2) is broadly consistent with Minculete et al. (2022); the present study extends this work by demonstrating, through direct practitioner testimony, the specific mechanism, namely early disruption identification and proactive mitigation, through which digital competence translates into operational outcomes. Similarly, the emphasis on communication and cross-functional collaboration (Section 4.1.4) corroborates Hennelly et al. (2020), although the present findings extend that work by situating collaborative competence within a disruption-response context rather than routine digitalisation. The findings diverge from prior literature in two respects.

First, whereas much of the existing employability literature, including Fajaryati et al. (2020) and Cheng et al. (2022), frames competency requirements in generic, sector-agnostic terms, the present findings indicate that Nigerian procurement professionals place comparatively greater emphasis on supply chain fundamentals as a precondition for technology adoption, plausibly because lower baseline digital infrastructure maturity makes foundational domain knowledge a more binding constraint than in advanced-economy settings. Second, the findings on organisational strategy suggest a more incremental, partnership-oriented approach to risk mitigation than is implied by case studies of large multinational deployments such as Walmart-IBM Food Trust; organisations in this study's sample, being predominantly mid-sized or public sector, pursue supplier diversification as a lower-cost complement to, rather than substitute for, large-scale platform investment. Taken together, the study's principal contribution lies not in identifying novel competency categories, since digital, behavioural, and strategic competence domains are well established, but in providing context-specific evidence of how these competencies interact with the infrastructural and institutional constraints of a developing-economy environment.

AI AND BLOCKCHAIN TOOLS FOR PROCUREMENT AND SUPPLY CHAIN PROFESSIONALS

Tables 1, 2 and 3 synthesise the AI and blockchain-enabled tools identified by informants and the broader literature as central to contemporary and future procurement and supply chain practice. Table 1 presents tools pertaining specifically to procurement functions; Table 2 presents tools relevant to broader supply chain management operations; and Table 3 presents blockchain-specific platforms relevant to traceability, supplier transparency, and contract automation. As noted in Section 4.1.2, informants' spontaneous references to blockchain-specific tools were fewer than to AI-enabled platforms, reflecting blockchain's comparatively earlier adoption stage; Table 3 is accordingly compiled from informant references combined with the blockchain applications identified in Section 2.3, to give blockchain competencies the proportionate treatment the study's title warrants.

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Table 1: AI-Powered Procurement Tools: Features and Applications

S/N	Tool	Key Features	Primary Use Cases
1	**SAP Ariba**	End-to-end procurement with AI-driven supplier discovery, contract management, and spend analytics.	Streamlining supplier onboarding, automating purchase orders, and enhancing supplier collaboration
2	**Coupa**	Cloud-based spend management with AI for spend visibility, supplier collaboration, and contract compliance	Optimising procurement processes, managing supplier relationships, and ensuring compliance
3	**GEP SMART**	Unified procurement platform with AI for sourcing, procurement, and supplier management	Enhancing sourcing strategies, managing supplier performance, and improving procurement efficiency

Table 2: AI-Powered Supply Chain Management Tools: Features and Applications

S/N	Tool	Key Features	Primary Use Cases
1	**Blue Yonder**	AI-driven platform for demand forecasting, inventory optimisation, and supply chain planning	Enhancing demand forecasting, optimising inventory, and improving supply chain planning
2	**IBM Watson Supply Chain**	AI-powered solutions for supply chain visibility, risk management, and predictive analytics	Managing supply chain risks, enhancing visibility, and predicting disruptions
3	**SAP IBP**	Cloud-based platform using AI for demand planning, inventory optimisation, and collaboration	Optimising demand planning, managing inventory, and enhancing collaboration

Table 3: Blockchain-Enabled Tools for Procurement and Supply Chain Transparency: Features and Applications

S/N	Tool	Key Features	Primary Use Cases
1	**IBM Blockchain (Food Trust)**	Permissioned distributed ledger enabling end-to-end product traceability and provenance verification across multi-tier supply networks	Verifying provenance, tracing contamination sources, demonstrating ethical sourcing compliance
2	**VeChain**	Enterprise blockchain platform combining IoT sensor integration with distributed ledger recording for product authentication	Authenticating goods, monitoring cold-chain conditions, deterring counterfeiting
3	**Hyperledger Fabric**	Permissioned, modular distributed ledger framework supporting customisable smart contracts and selective data visibility among consortium members	Automating multi-party contract execution, restricting data visibility to authorised supply chain partners

Table 3 illustrates that blockchain-enabled platforms cluster around four functional purposes mirroring Section 2.3: provenance verification, supplier and ESG transparency auditing, smart contract automation, and logistics documentation digitisation. These tools address a functionally distinct set of risks, namely trust, provenance, and multi-party coordination, that AI-enabled analytics tools (Tables 1 and 2) do not directly address, reinforcing the case for treating AI and blockchain competencies as complementary rather than substitutable.

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CONCLUSION, RECOMMENDATIONS AND IMPLICATIONS

Conclusion

This study has generated substantive empirical insights into the future-ready competency requirements of procurement and supply chain professionals in Nigeria, within the context of accelerating AI and blockchain integration. The findings show that effective professionals must cultivate an integrated portfolio spanning supply chain fundamentals, digital literacy and AI/blockchain proficiency, critical thinking, cross-functional collaboration, sustainability awareness and cultural intelligence, strategic thinking, and continuous improvement. At the organisational level, firms that have implemented collaborative partnerships, invested in digital capabilities, and adopted hybrid lean-agile frameworks demonstrate enhanced resilience against skill-mismatch vulnerabilities. At the educational level, the gap between graduate competencies and industry demands can be narrowed through curriculum co-design, targeted professional development, and institutionalised industry-academia structures. The influence of these competencies on outcomes is direct, manifesting in improved operational efficiency, cost management, service levels, risk mitigation, and innovation capacity.

Recommendations

Based on the foregoing conclusions, this study advances recommendations directed at distinct stakeholder groups. For education providers, supply chain management curricula should be subject to continuous review co-designed with industry partners, including professional bodies such as CIPS, CIPM, CILT, and PSPTB, with real-world case studies and simulation exercises embedded as core components; institutions should cultivate industry expert networks for guest lecturing and formalise internship and research partnership arrangements. For organisations, both public and private, structured training and development programmes targeting future-ready skills should be treated as strategic investment priorities, with particular attention to digital literacy, AI and blockchain adoption, and sustainability management, and recruitment frameworks should be redesigned to assess candidates for future-ready competencies alongside technical qualifications. For individual professionals, the study recommends active pursuit of recognised industry certifications, deliberate development of soft skill repertoires, and sustained engagement with lifelong learning through communities of practice and mentoring relationships. In a landscape defined by volatility, uncertainty, complexity, and ambiguity, the capacity for continuous self-reinvention is not merely advantageous but professionally existential.

The foregoing recommendations are elaborated below into specific implementation mechanisms. For organisations, four mechanisms are recommended. First, organisations should develop a competency framework operationalising the six future-ready skill dimensions identified in Section 2.1.1, mapped against job grades and used for recruitment assessment and performance review. Second, organisations of sufficient scale should establish an internal digital academy covering AI-enabled analytics, blockchain fundamentals, and data interpretation, with completion linked to an internal certification; smaller organisations should pursue shared-cost consortium arrangements with industry peers or bodies such as CIPS and CIPM. Third, organisations should institute structured mentoring pairings between senior professionals and junior staff developing digital and analytical competencies, with a defined cadence of meetings and documented goals. Fourth, organisations pursuing AI or blockchain adoption should accompany each rollout with a phased adoption roadmap that budgets for workforce capability-building alongside system procurement, including, for blockchain specifically, a dedicated capability programme addressing governance, cybersecurity awareness, and smart contract literacy.

For higher education providers, four parallel mechanisms are recommended. First, curricula should be redesigned around the same six-dimension competency framework, with modules mapped to technical, digital, analytical, behavioural, strategic, and adaptive competencies, rather than treating digital skills as a single bolt-on module. Second, institutions should establish formal industry advisory boards with a mandate to review curriculum content annually, institutionalising the academia-industry feedback loop that informants in Section 4.3 identified as currently inadequate. Third, institutions with sufficient resources should establish simulation laboratories and dedicated AI and blockchain laboratories using tools of the kind catalogued in Tables 1 through 3; where resources are constrained, institutions should pursue partnership arrangements with technology vendors for cloud-based simulation access. Fourth, institutions should expand internship placements and formalise stackable micro-credential pathways developed jointly with industry certification bodies, addressing the

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curriculum-practice gap identified in Section 4.3.1 in an auditable, credentialed manner.

Implications for Practice

The findings carry several implications for practice. First, organisations must reconceptualise investment in employee training, moving from episodic provision to institutionalised continuous learning ecosystems, particularly for digital literacy, AI tool proficiency, and sustainability management. Second, recruitment and talent management architectures require redesign to embed future-focused competency criteria, including digital literacy and collaborative mindsets, in candidate assessment, since recruitment anchored in historical competency profiles risks perpetuating skill mismatches. Third, supply chain departments should position themselves as active participants in co-designing curricula rather than passive consumers of graduate talent, generating mutual value as institutions gain currency with industry demands and organisations gain a more work-ready pipeline. Fourth, adoption of advanced digital tools, such as AI-driven forecasting and blockchain traceability, must be accompanied by investment in the human capabilities to operate and extract value from them; technology investment without corresponding human capital development risks value leakage and implementation failure.

Limitations and Directions for Future Research

A significant limitation of this study, acknowledged briefly in Section 3.3, is its exclusive focus on managerial and director-level informants. This leaves unaddressed the lived experience of operational-level personnel, namely purchasing officers, logistics officers, warehouse personnel, and supply chain analysts, who are typically first to encounter the operational consequences of AI- and blockchain-driven process redesign and who, as direct users of the tools discussed in Section 5, may hold systematically different perceptions of which competencies are most urgently required. Future research should extend this line of inquiry to operational-level employees for three reasons. First, operational-level staff are positioned to reveal competency gaps in day-to-day tool use that are not visible from a managerial vantage point. Second, operational-level perspectives would enable a more complete test of the augmentation-versus-displacement debate discussed in Section 2.5, since it is at this level that the effects of automation are most directly experienced. Third, incorporating operational-level voices would improve the transferability of future-ready skills frameworks, since interventions designed solely around managerial perceptions risk being misaligned with frontline skill deficits. Future studies might also adopt a longitudinal or mixed-methods design to track how competency requirements evolve as adoption matures, and extend the sectoral scope beyond the organisations represented in this study's sample.

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