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Research Article

Supply Chain Intelligence and Sustainable Indigenous Art Value Chains: Psychological Perspectives from West Africa

Ndebilie Chinyere E.,[1] Ohanele Rita C.,[2] Ipem Josephine N.,[3] Ihekwoaba Celestine K. C.[4]

[1,2] *Department of Fine and Applied Arts, Alvan Ikoku Federal University of Education, Owerri, Nigeria.*
[3,4] *Department of Curriculum &Instruction, Alvan Ikoku Federal University of Education, Owerri, Nigeria.*

ABSTRACT:
This study examined the influence of supply chain intelligence on sustainable indigenous art value chains in West Africa, with particular emphasis on the mediating role of psychological factors, including trust, perceived value, innovation readiness, and cultural identity. Although artificial intelligence (AI) is increasingly transforming supply chain operations, empirical evidence on its application within indigenous art ecosystems remains limited. Guided by the Resource-Based View (RBV) and the Theory of Planned Behavior (TPB), the study employed a cross-sectional survey design involving 468 indigenous artists, craft entrepreneurs, gallery operators, cultural tourism practitioners, and supply chain intermediaries across Nigeria, Ghana, and Benin. Data were analyzed using Structural Equation Modeling (SEM) in Smarts' 4. The measurement model demonstrated satisfactory reliability and validity (Cronbach's $\alpha = 0.89–0.94$; AVE > 0.50). The findings revealed that supply chain intelligence significantly and positively influenced sustainable indigenous art value chains ($\beta = 0.641$, $p < 0.001$). Psychological factors also partially mediated this relationship ($\beta = 0.287$, $p < 0.001$), suggesting that intelligent supply chain technologies produce greater sustainability outcomes when supported by favourable stakeholder perceptions and behavioural intentions. Furthermore, AI-enabled demand forecasting, digital provenance tracking, inventory optimization, and market analytics enhanced market resilience, strengthened cultural authenticity, and improved income opportunities for indigenous artists. The study advances the literature by integrating technological, sustainability, and psychological perspectives into a unified framework for understanding intelligent indigenous art value chains in West Africa. It further provides practical insights for policymakers, cultural institutions, development agencies, and creative industry practitioners seeking to promote sustainable and technology-enabled cultural economies.

Keywords: Artificial intelligence; Indigenous art value chains; Psychological perspectives; Supply chain intelligence; Sustainable development.

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1. INTRODUCTION

Artificial intelligence (AI) is rapidly transforming contemporary supply chain management through intelligent forecasting, predictive analytics, blockchain-enabled traceability, Internet of Things (IoT) integration, and real-time decision support. Collectively referred to as supply chain intelligence (SCI), these technologies enable organizations to improve operational efficiency, enhance transparency, strengthen resilience, and promote sustainable value creation across increasingly complex business environments. While intelligent supply chains have been widely adopted in manufacturing, healthcare, retail, and logistics, their application within indigenous cultural and creative industries remains comparatively underexplored despite growing recognition of the creative economy as an important driver of sustainable development (Ivanov & Dolgui, 2024; Queiroz et al., 2023).

The cultural and creative industries constitute one of the fastest-growing sectors of the global economy, generating employment, stimulating innovation, preserving cultural heritage, and contributing significantly to national development. Indigenous art including traditional textiles, sculpture, pottery, beadwork, wood carving, bronze casting, leather crafts, and other culturally embedded artistic expressions represents both an economic resource

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and a repository of historical knowledge and identity. Across West Africa, indigenous artistic traditions continue to sustain livelihoods, promote tourism, and reinforce community cohesion while preserving centuries of cultural heritage. Consequently, strengthening indigenous art value chains contributes not only to economic competitiveness but also to broader sustainability objectives, including inclusive growth, responsible production, and cultural preservation consistent with the United Nations Sustainable Development Goals (SDGs 8, 9, 11, and 12) (UNESCO, 2023; UNCTAD, 2024).

Despite their cultural and economic significance, indigenous art value chains in West Africa continue to face persistent structural and operational constraints. Fragmented production systems, limited market intelligence, inadequate logistics infrastructure, weak digital integration, product counterfeiting, and restricted access to international markets reduce competitiveness and limit income opportunities for indigenous artists and creative enterprises. These challenges are further exacerbated by increasing global competition from mass-produced imitations and insufficient mechanisms for verifying authenticity and provenance. Consequently, achieving sustainable indigenous art value chains requires innovative approaches capable of integrating technological advancement with cultural preservation and inclusive economic development (OECD, 2023).

Supply chain intelligence offers considerable potential to address these challenges by enabling data-driven decision-making across production, distribution, marketing, and customer engagement activities. AI-powered demand forecasting can improve production planning and inventory management, while blockchain technologies enhance product authentication and protect indigenous intellectual property. Similarly, predictive analytics and intelligent digital platforms facilitate market expansion, strengthen consumer confidence, and improve coordination among artists, cooperatives, galleries, tourism operators, and other supply chain actors. These technological capabilities collectively support more transparent, resilient, and sustainable indigenous art ecosystems capable of responding effectively to evolving market conditions.

However, the successful implementation of intelligent supply chain technologies extends beyond technological capability alone. Growing evidence suggests that behavioural and psychological factors significantly influence the adoption, acceptance, and effective utilization of AI-enabled innovations. Stakeholders' perceptions of trust, perceived value, innovation readiness, cultural compatibility, and confidence in digital systems shape their willingness to integrate intelligent technologies into existing production and commercial practices. Within indigenous creative industries, these psychological dimensions become particularly important because technological innovation often intersects with deeply embedded cultural traditions, community values, and concerns regarding authenticity and cultural ownership. Sustainable technological transformation therefore depends not only on the availability of intelligent systems but also on stakeholders' behavioural readiness to embrace them (Dwivedi et al., 2023; Venkatesh et al., 2022).

Although scholarly interest in AI-enabled supply chains and sustainable supply chain management has expanded considerably in recent years, several important gaps remain. Existing empirical studies have predominantly focused on manufacturing, agriculture, healthcare, retail, and logistics, with relatively limited attention devoted to indigenous cultural industries, particularly within African contexts. Furthermore, prior research has generally examined technological capability, operational performance, or organizational efficiency independently, while giving comparatively little attention to the psychological mechanisms through which supply chain intelligence influences sustainable indigenous art value chains. Consequently, understanding how technological capabilities and stakeholder psychology jointly shape sustainable cultural value creation remains an underdeveloped area of research.

Drawing upon the Resource-Based View (RBV) and the Theory of Planned Behavior (TPB), this study addresses these gaps by examining the influence of

supply chain intelligence on sustainable indigenous art value chains in West Africa while investigating the mediating role of psychological factors. Specifically, the study seeks to determine whether supply chain intelligence enhances sustainable indigenous art value chains directly, whether it positively influences stakeholders' psychological dispositions, and whether psychological factors mediate the relationship between intelligent supply chain capabilities and sustainable value chain outcomes.

This study contributes to the emerging literature in four important ways. First, it extends supply chain intelligence research into the relatively underexplored context of indigenous art value chains within West Africa. Second, it integrates technological capability and behavioural perspectives by demonstrating how psychological factors shape the sustainability outcomes of AI-enabled supply chain innovations. Third, it enriches the application of the Resource-Based View and the Theory of Planned Behavior within cultural and creative industries, offering a more comprehensive explanation of intelligent value chain development. Finally, the findings provide practical insights for policymakers, cultural institutions, development agencies, technology providers, and indigenous creative entrepreneurs seeking to leverage intelligent supply chain innovations to strengthen cultural preservation, economic resilience, and sustainable development. The remainder of this paper reviews the relevant literature, develops the theoretical framework and hypotheses, presents the research methodology and empirical findings, discusses the study's implications, and concludes with recommendations for future research.

2. LITERATURE REVIEW

2.1 Supply Chain Intelligence: Concept, Evolution and Strategic Capabilities

Supply chain intelligence (SCI) represents the strategic integration of advanced digital technologies, including artificial intelligence (AI), machine learning, big data analytics, blockchain, and Internet of Things (IoT), into supply chain decision-making processes. Unlike traditional supply chain management approaches that emphasize efficiency, coordination, and cost reduction, SCI focuses on developing predictive, adaptive, and data-driven capabilities that enable organizations to anticipate disruptions, optimize resource allocation, and create sustainable competitive advantage. Recent scholarship suggests that the emergence of SCI reflects a broader transition from digitally enabled supply chains toward intelligent ecosystems capable of autonomous learning, real-time adaptation, and continuous improvement (Culot et al., 2024; Smyth et al., 2024).

The evolution of SCI is closely associated with the progression of Industry 4.0 technologies and the increasing complexity of global supply networks. Earlier digital supply chain systems primarily focused on information sharing through enterprise resource planning (ERP) platforms and electronic data interchange. However, contemporary intelligent systems extend beyond information management by employing predictive analytics and artificial intelligence algorithms to generate strategic insights from large and diverse datasets. Through these capabilities, organizations can forecast demand fluctuations, identify emerging risks, improve supplier coordination, and enhance operational resilience. Evidence from recent systematic reviews indicates that AI applications in supply chain management have expanded considerably across areas such as demand forecasting, logistics optimization, inventory management, procurement, and disruption prediction (Culot et al., 2024; Smyth et al., 2024).

Beyond operational efficiency, SCI has increasingly been associated with sustainability-oriented supply chain transformation. Intelligent analytics enable organizations to minimize waste, optimize resource utilization, improve traceability, and support circular economy practices. Similarly, blockchain-enabled systems provide enhanced transparency by recording product histories and supply chain transactions, thereby improving accountability and stakeholder trust. However, recent literature cautions that technological capability alone does not automatically produce sustainable outcomes. Rather, the value generated by SCI depends on complementary organizational resources,

governance structures, human capabilities, and stakeholder acceptance. Consequently, SCI should be understood as a socio-technical capability in which technology interacts with organizational and behavioural factors to generate meaningful transformation (Smyth et al., 2024).

Although the SCI literature has expanded rapidly, important contextual limitations remain. Existing empirical studies have concentrated largely on manufacturing, logistics, healthcare, and conventional retail environments, where technological infrastructure and organizational capabilities are relatively mature. Comparatively limited attention has been devoted to creative and cultural industries, where value creation depends not only on operational efficiency but also on authenticity, cultural identity, knowledge preservation, and community participation. This limitation is particularly evident within indigenous art ecosystems, where supply chains are often informal, fragmented, and constrained by weak market intelligence, limited distribution networks, inadequate provenance mechanisms, and restricted access to global markets.

Within indigenous art value chains, SCI offers potential pathways for transforming traditional production and commercialization systems. AI-driven demand analytics can support artists and cultural enterprises in understanding market preferences, while digital provenance technologies can strengthen authenticity verification and protect indigenous intellectual property. Similarly, intelligent platforms can improve connections between artists, galleries, tourism operators, collectors, and international consumers. Nevertheless, the adoption and effectiveness of such systems depend on stakeholders' willingness to trust, accept, and integrate intelligent technologies within culturally sensitive environments.

Therefore, the literature suggests that SCI should not be viewed merely as a technological innovation but as a strategic capability embedded within broader social, organizational, and cultural contexts. While existing studies have established the operational and sustainability benefits of intelligent supply chains, limited empirical evidence explains how these capabilities can support indigenous cultural value chains, particularly within developing regions such as West Africa. Addressing this gap requires examining SCI alongside the behavioural and psychological mechanisms that influence stakeholder engagement. This provides the foundation for exploring sustainable indigenous art value chains as socio-technical ecosystems where intelligent technologies, human behaviour, and cultural sustainability intersect.

2.2 Sustainable Indigenous Art Value Chains

Sustainable indigenous art value chains represent interconnected networks through which culturally embedded artistic products are created, transformed, distributed, exchanged, and consumed while generating economic, social, cultural, and environmental value. Unlike conventional commercial value chains that primarily prioritize efficiency, productivity, and profitability, indigenous art value chains operate within broader socio-cultural systems where authenticity, heritage preservation, community participation, and intergenerational knowledge transfer are central determinants of value creation. Consequently, sustainability within indigenous art ecosystems requires balancing market expansion with the preservation of cultural identity, ethical commercialization, and equitable participation among creators and communities (UNCTAD, 2024; UNESCO, 2023).

The growing recognition of the creative economy has repositioned indigenous art from a traditional cultural activity into a significant contributor to sustainable development. Creative industries increasingly function as platforms for employment generation, entrepreneurship, tourism development, and social inclusion, particularly in developing economies where cultural assets represent important sources of local economic resilience. However, scholars emphasize that the sustainability of creative industries depends not only on commercialization but also on maintaining cultural authenticity, protecting indigenous knowledge systems, and ensuring that economic benefits are fairly distributed among cultural producers (Duxbury et al., 2021; UNCTAD, 2024). This perspective highlights indigenous art value chains as complex

ecosystems where economic objectives intersect with cultural and social responsibilities.

Across West Africa, indigenous art constitutes an important component of cultural heritage and creative entrepreneurship. Artistic traditions such as Nigerian Adire textiles, Benin bronze casting, Ghanaian Kente weaving, Akwete cloth production, wood carving, pottery, beadwork, and leather crafts demonstrate the region's rich artistic diversity and historical knowledge systems. Despite their cultural significance, many indigenous art value chains remain fragmented and largely informal, limiting their capacity to compete within increasingly globalized creative markets. Challenges including weak distribution networks, limited access to digital platforms, inadequate branding, poor market information, counterfeiting, and insufficient mechanisms for product authentication continue to restrict economic opportunities for indigenous artists and creative enterprises (UNESCO, 2023; UNCTAD, 2024).

Digital transformation and intelligent supply chain capabilities offer emerging pathways for addressing these structural limitations. Technologies such as artificial intelligence, blockchain, digital marketplaces, and data analytics can enhance transparency, improve market access, strengthen provenance verification, and support demand-driven production. For indigenous art ecosystems, digital provenance mechanisms are particularly valuable because authenticity and cultural origin significantly influence consumer trust and product value. Similarly, AI-enabled analytics can assist artists and cultural entrepreneurs in identifying consumer preferences, forecasting demand, and optimizing production decisions while maintaining cultural integrity (Culot et al., 2024; Queiroz et al., 2023). Thus, SCI provides a potential mechanism through which indigenous art value chains can become more resilient, transparent, and economically sustainable.

However, the integration of intelligent technologies into indigenous art ecosystems presents important sustainability considerations. Excessive commercialization may encourage cultural commodification, weaken traditional practices, or shift control away from indigenous communities toward external market actors. Therefore, sustainable indigenous art value chains require governance approaches that balance technological innovation with cultural sovereignty, ethical participation, and community ownership. Recent sustainability scholarship increasingly recognizes that cultural sustainability represents a critical dimension of sustainable development because economic advancement without protection of heritage and identity may undermine the very resources upon which creative economies depend (Duxbury et al., 2021; UNESCO, 2023).

A critical synthesis of the literature reveals that research on sustainable value chains has traditionally focused on sectors such as agriculture, manufacturing, fashion, and food systems, while indigenous cultural value chains remain comparatively underexplored, particularly in African contexts. Existing studies also provide limited understanding of how technological capabilities interact with human perceptions, cultural values, and behavioural responses to shape sustainability outcomes. Therefore, sustainable indigenous art value chains should be examined as socio-technical systems where intelligent supply chain capabilities and stakeholder psychology jointly determine the capacity of creative communities to achieve resilient and inclusive development. This observation provides the foundation for examining the psychological mechanisms that influence the adoption and effectiveness of supply chain intelligence within indigenous art ecosystems.

2.3 Psychological Mechanisms Underpinning Intelligent Indigenous Art Value Chains

The sustainability outcomes of supply chain intelligence (SCI) are not determined solely by technological sophistication but also by the psychological responses of stakeholders who interact with intelligent systems. Emerging research in digital transformation and technology adoption demonstrates that individuals and organizations evaluate technological innovations through cognitive, emotional, and behavioural processes that influence acceptance, usage, and long-term commitment. Within indigenous art value chains, where production practices are deeply connected to

cultural identity, traditional knowledge, and community-based relationships, psychological mechanisms become particularly significant in determining whether AI-enabled supply chain systems are perceived as empowering tools or disruptive external interventions (Dwivedi et al., 2023; Venkatesh et al., 2022).

Trust in intelligent systems represents a fundamental psychological mechanism influencing the adoption and effective utilization of AI-driven supply chain technologies. Trust reflects stakeholders' confidence in the reliability, transparency, fairness, and competence of intelligent systems when supporting decision-making processes. Previous studies indicate that uncertainty regarding algorithmic decision-making, data ownership, privacy concerns, and perceived loss of human control can limit technology acceptance, particularly among users with limited digital experience (Glikson & Woolley, 2020; Jöhnk et al., 2021). In indigenous art ecosystems, trust is especially important because artists and cultural entrepreneurs may be concerned that digital systems could misrepresent cultural meanings, compromise ownership rights, or reduce human creativity. Therefore, confidence in the fairness and cultural sensitivity of intelligent technologies is likely to influence stakeholders' willingness to integrate SCI into artistic production and commercialization processes.

Innovation readiness constitutes another critical psychological dimension affecting the success of intelligent supply chain adoption. Innovation readiness refers to stakeholders' preparedness, capability, and willingness to embrace technological change. Research on digital transformation suggests that organizations with higher levels of technological readiness and adaptive capability are more likely to successfully implement AI-based systems because they possess greater confidence in learning, experimentation, and change management (Parasuraman, 2000; Weiner, 2009). Within indigenous art value chains, innovation readiness may determine whether traditional producers perceive AI tools as complementary resources that enhance market access and sustainability or as technologies incompatible with established cultural practices. Consequently, readiness among artists, cooperatives, galleries, and cultural institutions becomes essential for achieving meaningful digital transformation.

Perceived value further influences stakeholders' acceptance of intelligent supply chain technologies by shaping beliefs regarding expected benefits relative to costs and risks. According to technology adoption literature, individuals are more likely to embrace innovations when they perceive clear economic, functional, and social benefits. In creative industries, perceived value extends beyond financial returns to include improved visibility, market recognition, preservation of cultural authenticity, and greater control over intellectual property. For indigenous artists, AI-enabled platforms that improve market reach, enhance product authentication, and facilitate direct engagement with consumers may generate stronger adoption intentions when these benefits are clearly recognized (Venkatesh et al., 2022).

Cultural compatibility and identity provide an additional psychological mechanism that is particularly relevant to indigenous art ecosystems. Unlike conventional commercial products, indigenous artworks often represent collective histories, symbolic meanings, and community identities. Consequently, technological systems introduced into these environments must align with cultural values and respect indigenous knowledge structures. Research on technology adoption in culturally embedded contexts demonstrates that perceived compatibility between innovation and existing values significantly influences acceptance and sustained usage (Venkatesh et al., 2022). Technologies that disregard cultural ownership, traditional production methods, or community participation may encounter resistance, whereas systems designed to preserve authenticity and empower cultural producers are more likely to achieve acceptance.

Collectively, these psychological mechanisms suggest that the relationship between SCI and sustainable indigenous art value chains is not purely technological but fundamentally socio-technical. While SCI provides the capabilities required for improved traceability, market intelligence, and

operational resilience, psychological factors determine whether stakeholders are willing and able to convert these capabilities into sustainable value creation. However, existing research has largely examined technology adoption within conventional organizational settings, with limited attention to indigenous creative communities where technological innovation intersects with heritage preservation and cultural sustainability. Addressing this gap, the present study conceptualizes psychological mechanisms as a mediating construct that explains how supply chain intelligence influences sustainable indigenous art value chains within the West African context.

2.4 Theoretical Framework

2.4.1 Resource-Based View (RBV)

The Resource-Based View (RBV) provides the foundational theoretical lens for explaining how supply chain intelligence can function as a strategic capability for developing sustainable indigenous art value chains. Originally advanced by Barney (1991), RBV proposes that organizations achieve sustained competitive advantage through the acquisition, development, and deployment of valuable, rare, inimitable, and non-substitutable resources. Unlike traditional perspectives that emphasize external market positioning, RBV highlights the importance of internal capabilities in enabling organizations to adapt, innovate, and create superior value.

Within the context of intelligent supply chains, SCI can be conceptualized as a strategic organizational capability rather than merely a technological asset. Artificial intelligence, predictive analytics, blockchain, and digital platforms generate value when organizations possess the capability to integrate these technologies with existing knowledge, processes, and stakeholder networks. Recent supply chain scholarship supports this perspective by demonstrating that digital technologies contribute to resilience and sustainability when combined with complementary organizational capabilities, including data-driven decision-making, innovation capability, and adaptive learning (Culot et al., 2024; Ivanov & Dolgui, 2021).

Applied to indigenous art value chains, RBV provides an explanation for how intelligent technologies can transform culturally embedded creative resources into sustainable economic and social value. Indigenous artistic knowledge, cultural authenticity, community networks, and traditional production practices represent unique intangible resources that are difficult for competitors to replicate. When combined with SCI capabilities, these resources can support improved market intelligence, digital provenance, consumer engagement, and global market access. Thus, RBV suggests that the sustainability potential of indigenous art value chains depends not only on technological availability but on the ability of stakeholders to strategically integrate technology with culturally embedded resources.

However, RBV alone provides limited explanation regarding why stakeholders choose to adopt or reject intelligent technologies. While the theory explains the strategic value of resources and capabilities, it does not sufficiently address the cognitive and behavioural processes influencing technology acceptance. This limitation necessitates the integration of a complementary behavioural theory.

2.4.2 Theory of Planned Behavior (TPB)

The Theory of Planned Behavior (TPB), developed by Ajzen (1991), provides a behavioural explanation for technology adoption by proposing that individual intentions and actions are shaped by three central factors: attitudes toward the behaviour, subjective norms, and perceived behavioural control. According to TPB, individuals are more likely to engage in a behaviour when they perceive it positively, believe that important social actors support it, and feel capable of performing the behaviour effectively.

Within intelligent indigenous art value chains, TPB explains how artists, cultural entrepreneurs, galleries, and other stakeholders develop willingness to engage with AI-enabled supply chain technologies. Stakeholders' attitudes may be influenced by perceived benefits such as improved market access, enhanced authenticity verification, and increased income opportunities. Subjective norms may reflect expectations from cultural

organizations, government agencies, consumers, or industry networks regarding digital transformation. Perceived behavioural control relates to stakeholders' confidence in their ability to access, understand, and effectively utilize intelligent technologies.

Recent digital transformation research confirms that technology adoption is strongly influenced by psychological factors, including trust, perceived usefulness, technological confidence, and readiness for change (Dwivedi et al., 2023; Venkatesh et al., 2022). In indigenous cultural contexts, these behavioural considerations become even more significant because technology adoption is closely connected to issues of cultural preservation, identity, and ownership. TPB therefore provides an appropriate framework for understanding why stakeholders may embrace intelligent systems when they perceive them as culturally compatible and beneficial.

2.4.3 Theoretical Integration: Explaining Intelligent Indigenous Art Value Chains

Although RBV and TPB originate from different intellectual traditions, their integration provides a more comprehensive explanation of SCI-driven sustainability outcomes. RBV explains the strategic capability dimension by demonstrating how SCI represents a valuable organizational resource that can enhance resilience, efficiency, and sustainability. Conversely, TPB explains the human behavioural dimension by clarifying how stakeholder attitudes, perceptions, and readiness influence whether these capabilities are successfully adopted and converted into meaningful outcomes.

This integrated perspective is particularly suitable for indigenous art value chains because these ecosystems represent socio-technical environments where technological resources and human-cultural factors interact. SCI may provide the infrastructure required for intelligent production, traceability, and market expansion; however, sustainable outcomes depend on whether stakeholders trust these systems, perceive value in their application, possess innovation readiness, and consider them compatible with cultural values.

Therefore, this study combines RBV and TPB to propose that supply chain intelligence influences sustainable indigenous art value chains through psychological mechanisms that facilitate stakeholder acceptance and effective utilization. This theoretical integration extends existing supply chain and digital transformation literature by moving beyond technology-centric explanations toward a more holistic understanding of how intelligent systems, human behaviour, and cultural sustainability interact within emerging creative economies.

2.5 Empirical Review

Empirical research on supply chain intelligence has increasingly demonstrated its transformative influence on organizational performance, resilience, and sustainability. Recent studies indicate that artificial intelligence (AI), predictive analytics, and digital supply chain technologies improve firms' ability to anticipate market changes, optimize operations, and respond effectively to disruptions. For instance, Culot et al. (2024), through a systematic review of empirical studies, established that AI applications within supply chains are predominantly concentrated in demand forecasting, logistics optimization, inventory management, and risk prediction. Their findings suggest that intelligent technologies generate significant operational benefits; however, they also emphasize that successful implementation depends on complementary organizational capabilities and contextual conditions. Similarly, Smyth et al. (2024) demonstrated that AI-enabled analytics enhance supply chain resilience by improving predictive decision-making and enabling proactive responses to uncertainty. Nevertheless, their review revealed that much of the existing empirical evidence remains concentrated in manufacturing and large-scale industrial environments, creating uncertainty regarding applicability within informal and culturally embedded value chains.

Empirical investigations have also highlighted the importance of behavioural and psychological factors in determining the effectiveness of intelligent technology adoption. While technological capability provides the foundation for digital transformation, research consistently indicates that human

acceptance, trust, perceived usefulness, and organizational readiness significantly influence adoption outcomes. Jöhnk et al. (2021) found that organizational AI readiness depends on technological, structural, and human factors, suggesting that investment in digital infrastructure alone is insufficient for successful implementation. Similarly, studies grounded in technology adoption theories demonstrate that perceived value and confidence in intelligent systems influence stakeholders' willingness to integrate emerging technologies into their activities (Venkatesh et al., 2022). These findings are particularly relevant to indigenous art value chains, where stakeholders may evaluate intelligent technologies not only according to economic benefits but also according to their compatibility with cultural practices and traditional knowledge systems.

Research within creative and cultural industries further demonstrates that digital transformation can enhance market access, visibility, and sustainability while simultaneously generating concerns regarding authenticity, ownership, and cultural preservation. Studies on the creative economy indicate that digital platforms have expanded opportunities for cultural producers by connecting local creators with global audiences and reducing traditional market barriers (UNCTAD, 2024). However, empirical evidence also suggests that digitalization may create tensions between commercialization and cultural integrity, particularly where indigenous knowledge and artistic expressions are involved. Duxbury et al. (2021) argue that sustainable cultural development requires balancing economic objectives with cultural continuity, community participation, and protection of heritage resources. Therefore, technological interventions within indigenous creative ecosystems must account for both market efficiency and cultural sustainability.

Within African contexts, empirical research on digital transformation in cultural industries remains comparatively limited. Existing studies have primarily examined creative entrepreneurship, cultural tourism, and digital platforms, with less attention devoted to supply chain intelligence as an integrated ecosystem capability. This represents a significant gap because indigenous art production and commercialization involve complex networks of artists, suppliers, cultural institutions, tourism operators, collectors, and consumers. Unlike conventional supply chains, indigenous art value chains depend heavily on trust-based relationships, authenticity signals, community legitimacy, and cultural identity. Consequently, the effectiveness of SCI within these contexts cannot be fully explained through technological capability alone.

Furthermore, empirical studies have rarely examined the mediating role of psychological mechanisms between intelligent technologies and sustainability outcomes. Existing research has largely adopted a direct-effect perspective, assuming that digital technologies automatically generate improved performance. However, evidence from technology adoption and organizational change literature suggests that stakeholder beliefs, readiness, trust, and perceived value determine whether technological capabilities are translated into practical outcomes (Dwivedi et al., 2023; Weiner, 2009). This limitation is particularly important within West African indigenous art ecosystems, where technological adoption must operate within culturally sensitive environments characterized by informal structures and diverse stakeholder expectations.

Overall, the empirical literature establishes that supply chain intelligence can enhance sustainability, resilience, and market performance. However, three important gaps remain. First, existing studies focus predominantly on industrial supply chains rather than creative and indigenous cultural value chains. Second, limited empirical attention has been given to African contexts, particularly West African indigenous art ecosystems. Third, the behavioural mechanisms through which stakeholders translate intelligent technologies into sustainable value creation remain insufficiently understood. Addressing these gaps, this study investigates the mediating role of psychological mechanisms in the relationship between supply chain intelligence and sustainable indigenous art value chains across West Africa.

2.6 Research Gap

Despite increasing scholarly interest in artificial intelligence (AI), digital transformation, and intelligent supply chain management, significant gaps remain in understanding how supply chain intelligence (SCI) contributes to sustainability within culturally embedded creative ecosystems. Existing empirical studies have established that AI-enabled supply chain capabilities enhance forecasting accuracy, operational resilience, transparency, and resource efficiency; however, these investigations have predominantly focused on manufacturing, logistics, retail, and industrial supply networks (Culot et al., 2024; Smyth et al., 2024). Consequently, limited knowledge exists regarding how SCI can support indigenous creative industries where value creation depends not only on operational efficiency but also on cultural authenticity, heritage preservation, and community participation.

A major conceptual gap concerns the limited integration between intelligent supply chain research and cultural value chain scholarship. While conventional supply chain literature emphasizes technological capabilities and performance outcomes, indigenous art ecosystems operate through complex socio-cultural relationships involving artists, cultural institutions, consumers, tourism actors, and community stakeholders. These ecosystems require approaches that recognize cultural identity, indigenous knowledge, and authenticity as strategic resources rather than merely production characteristics. Existing studies have yet to sufficiently explain how intelligent supply chain capabilities can be adapted to strengthen sustainability within indigenous art value chains.

A second gap relates to the limited geographical and contextual representation of existing empirical evidence. Much of the current literature on AI-enabled supply chains originates from technologically advanced economies with formalized organizational structures and established digital infrastructures. Comparatively little empirical attention has been devoted to developing regions, particularly West Africa, where indigenous art production remains an important component of cultural identity, creative entrepreneurship, and local economic development. This contextual limitation restricts understanding of how technological innovation interacts with informal structures, resource constraints, and culturally embedded practices.

Furthermore, existing research provides insufficient explanation of the behavioural mechanisms through which intelligent technologies generate sustainable outcomes. Many studies examine direct relationships between digital technologies and organizational performance, implicitly assuming that technological adoption automatically produces benefits. However, technology acceptance literature demonstrates that trust, innovation readiness, perceived value, and cultural compatibility significantly influence whether stakeholders embrace and effectively utilize emerging technologies (Dwivedi et al., 2023; Venkatesh et al., 2022). Within indigenous art ecosystems, these psychological factors may determine whether SCI becomes a tool for empowerment and sustainability or a source of resistance and cultural disruption.

Methodologically, limited empirical research has examined the mediating role of psychological mechanisms in the relationship between SCI and sustainable value chain outcomes. This represents an important omission because understanding the mechanism through which technology influences sustainability provides deeper theoretical and practical insight than examining direct effects alone.

Therefore, this study addresses these gaps by developing and empirically testing an integrated framework that examines the relationship between supply chain intelligence and sustainable indigenous art value chains, while positioning psychological mechanisms as a mediating pathway. By focusing on West Africa, the study extends existing supply chain and digital transformation literature into an underexplored cultural context and contributes a socio-technical perspective that connects technological capability, human behaviour, and cultural sustainability.

2.7 Conceptual Framework

The conceptual framework of this study is grounded in the assumption that sustainable indigenous art value chains emerge through the interaction between

technological capabilities, stakeholder psychology, and culturally embedded value creation processes. While existing research has established the transformative potential of artificial intelligence (AI) and digital technologies in improving supply chain performance, the extent to which these capabilities generate sustainable outcomes within indigenous creative ecosystems remains insufficiently understood. This study therefore conceptualizes supply chain intelligence (SCI) as a strategic technological capability that influences sustainable indigenous art value chains through psychological mechanisms that shape stakeholder acceptance, engagement, and behavioural adaptation.

Supply chain intelligence is conceptualized as a multidimensional capability involving AI-driven analytics, digital traceability, predictive decision-making, and market intelligence. Contemporary supply chain research suggests that digital technologies create strategic value when organizations develop the capability to collect, analyze, and transform data into actionable knowledge for improved decision-making and resilience (Wamba et al., 2020; Bag et al., 2021). In indigenous art ecosystems, these capabilities can enhance visibility across fragmented value networks, improve product authentication, support demand forecasting, and facilitate connections between artists, cultural institutions, tourism actors, and global consumers. Thus, SCI is expected to provide the technological foundation required for strengthening the sustainability and competitiveness of indigenous art value chains.

However, the framework recognizes that technological capability alone does not guarantee successful transformation. Drawing from technology adoption scholarship, the study positions psychological mechanisms as a mediating construct explaining how stakeholders translate technological opportunities into practical outcomes. Trust in intelligent systems influences confidence in AI-supported decisions, while innovation readiness reflects stakeholders' willingness and capability to embrace digital change. Similarly, perceived value shapes beliefs regarding the economic and cultural benefits of intelligent technologies, whereas cultural compatibility determines whether these innovations align with indigenous knowledge systems, artistic traditions, and community values (Davis, 1989; Venkatesh et al., 2003; Davis, 1989).

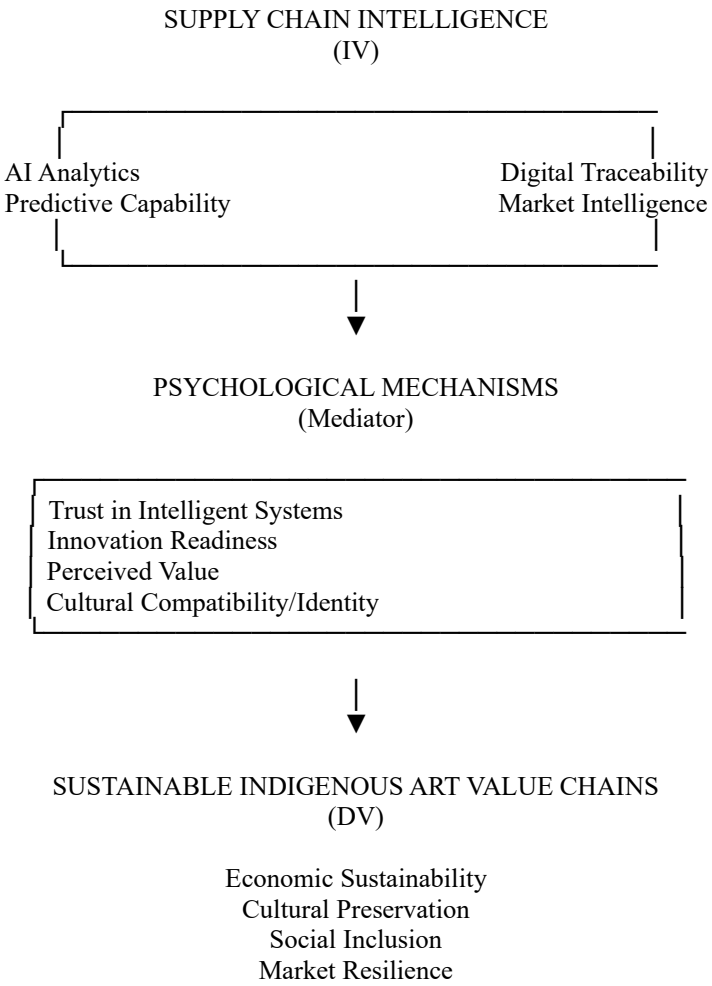
The inclusion of cultural compatibility as a psychological dimension represents an important extension beyond conventional technology adoption models. Indigenous art value chains differ from industrial supply chains because artistic products often embody collective memory, cultural symbolism, and community identity. Therefore, successful digital transformation requires technologies that enhance visibility and market access without undermining cultural ownership or authenticity. Sustainable innovation within indigenous creative industries must consequently balance technological advancement with respect for indigenous knowledge, ethical commercialization, and community participation (Smith, 2021; Duxbury et al., 2021).

The dependent construct, sustainable indigenous art value chains, is conceptualized as the ability of indigenous creative ecosystems to achieve economic viability, cultural preservation, social inclusion, and long-term market resilience. This perspective extends traditional supply chain sustainability approaches by recognizing that value creation within cultural industries involves both tangible outcomes, such as income generation and market expansion, and intangible outcomes, including heritage preservation and identity reinforcement. Accordingly, sustainability is viewed as a multidimensional outcome produced through the interaction of intelligent technologies, stakeholder behaviour, and cultural governance.

Based on these relationships, this study proposes that supply chain intelligence positively influences sustainable indigenous art value chains, but that this relationship is strengthened through psychological mechanisms that facilitate technology acceptance and culturally appropriate implementation. The proposed framework therefore positions psychological mechanisms as a mediating pathway between SCI and sustainable indigenous art value chains, providing a socio-technical explanation of

how digital intelligence can support sustainable cultural development within West Africa.

The conceptual model is presented as follows:



2.8 Hypotheses Development

Building on the integrated Resource-Based View (RBV) and Theory of Planned Behavior (TPB) framework, this study proposes that sustainable indigenous art value chains emerge through the interaction between technological capabilities and stakeholder behavioural responses. While supply chain intelligence (SCI) provides the technological infrastructure required for improved visibility, coordination, and market responsiveness, psychological mechanisms determine whether stakeholders effectively adopt and utilize these capabilities. Accordingly, the study develops four hypotheses explaining the direct and mediated relationships among supply chain intelligence, psychological mechanisms, and sustainable indigenous art value chains.

2.8.1 Supply Chain Intelligence and Sustainable Indigenous Art Value Chains

Supply chain intelligence enables organizations to transform fragmented information into actionable knowledge through artificial intelligence, predictive analytics, digital traceability, and real-time decision-support systems. From an RBV perspective, these capabilities represent strategic resources that can enhance competitiveness by improving operational efficiency, adaptability, and innovation capacity. Empirical research demonstrates that intelligent supply chain capabilities contribute to improved

sustainability outcomes by strengthening transparency, resource optimization, and resilience across value networks (Bag et al., 2021; Wamba et al., 2020).

Within indigenous art ecosystems, SCI can address several structural challenges that constrain sustainability, including limited market information, weak distribution channels, inadequate product authentication, and restricted access to global consumers. AI-enabled market analytics can assist artists and cultural enterprises in understanding consumer preferences, while digital provenance systems can strengthen authenticity and trust among buyers. Consequently, intelligent supply chain capabilities are expected to enhance economic sustainability, cultural preservation, and market resilience within indigenous art value chains.

Therefore, the first hypothesis is proposed:
H1: Supply chain intelligence has a significant positive effect on sustainable indigenous art value chains**.**

2.8.2 Supply Chain Intelligence and Psychological Mechanisms

Although technological capability provides the foundation for digital transformation, its effectiveness depends on stakeholders' cognitive and behavioural responses toward adoption. Technology adoption literature suggests that individuals and organizations evaluate innovations based on perceived usefulness, trust, readiness, and compatibility with existing practices (Davis, 1989; Venkatesh et al., 2003). In this context, SCI may influence psychological mechanisms by shaping stakeholders' perceptions of technological usefulness, confidence, and willingness to engage with intelligent systems.

For indigenous artists and cultural entrepreneurs, exposure to AI-enabled supply chain solutions may improve perceptions regarding market opportunities, transparency, and creative empowerment. Similarly, intelligent technologies that provide reliable information and protect cultural authenticity may strengthen trust and reduce resistance to digital transformation. However, these psychological outcomes depend on whether technologies are perceived as supportive rather than disruptive to existing cultural practices.

Therefore, the second hypothesis is proposed:
H2: Supply chain intelligence has a significant positive effect on psychological mechanisms among stakeholders in indigenous art value chains

2.8.3 Psychological Mechanisms and Sustainable Indigenous Art Value Chains

Psychological mechanisms represent the human factors through which technological capabilities are converted into sustainable outcomes. Trust, innovation readiness, perceived value, and cultural compatibility influence whether stakeholders actively participate in digital transformation initiatives. Research on technology adoption consistently demonstrates that positive attitudes and behavioural intentions contribute significantly to successful technology implementation and sustained usage (Venkatesh et al., 2012).

In indigenous art value chains, stakeholders who perceive intelligent systems as valuable, trustworthy, and culturally compatible are more likely to integrate these technologies into production, marketing, and distribution activities. Higher innovation readiness may encourage experimentation with digital platforms, while cultural compatibility ensures that technological transformation aligns with heritage preservation objectives. Consequently, psychological acceptance is expected to enhance the sustainability outcomes associated with intelligent value chains.

Therefore, the third hypothesis is proposed:
H3: Psychological mechanisms have a significant positive effect on sustainable indigenous art value chains**.**

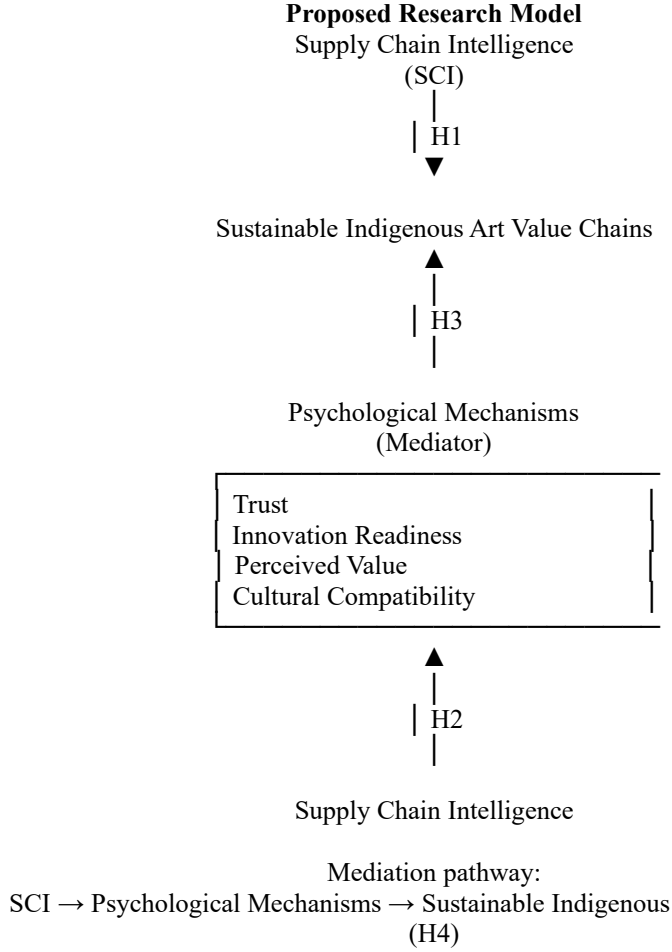
2.8.4 Mediating Role of Psychological Mechanisms

Although previous research has examined the direct influence of digital technologies on supply chain outcomes, technology adoption studies indicate that behavioural and cognitive mechanisms often explain how technological capabilities generate practical benefits. In other words, technologies create opportunities, but human acceptance and

engagement determine whether these opportunities are converted into sustainable outcomes.

Within indigenous art ecosystems, SCI may provide access to advanced analytics, digital marketplaces, and traceability mechanisms; however, these capabilities may remain underutilized if stakeholders lack trust, readiness, or perceived alignment with cultural values. Psychological mechanisms therefore represent a critical transmission pathway through which SCI influences sustainability performance. This mediating perspective extends existing supply chain research by recognizing that intelligent systems operate within social and cultural environments rather than independently from human behaviour.

Therefore, the fourth hypothesis is proposed:
H4: Psychological mechanisms significantly mediate the relationship between supply chain intelligence and sustainable indigenous art value chains.



3. METHODOLOGY

3.1 Research Design and Approach

This study adopted a quantitative, cross-sectional research design to empirically examine the relationship between supply chain intelligence, psychological mechanisms, and sustainable indigenous art value chains within the West African creative economy. A quantitative approach was considered appropriate because the study sought to test theoretically derived relationships among measurable constructs and evaluate the proposed mediation model using statistical techniques. Specifically, the study employed a survey-based methodology because perceptions regarding artificial intelligence-enabled supply chain practices, stakeholder trust, innovation readiness,

and cultural compatibility are subjective phenomena that require direct measurement from relevant participants.

The study was guided by a positivist research orientation, which assumes that social phenomena can be systematically observed, measured, and analyzed through empirical investigation. This approach aligns with previous technology adoption and supply chain studies that have examined digital transformation outcomes through structured instruments and multivariate statistical analysis (Hair et al., 2022; Sekaran & Bougie, 2020). The cross-sectional design enabled the collection of data from indigenous art ecosystem stakeholders at a specific period, allowing assessment of current levels of intelligent supply chain adoption and sustainability practices across selected West African contexts.

3.2 Study Context, Population and Sampling

The study was conducted across three West African countries: Nigeria, Ghana, and Benin. These countries were selected because of their significant indigenous artistic traditions, expanding creative economies, and increasing engagement with digital transformation initiatives. Nigeria represents one of Africa's largest creative markets, while Ghana and Benin possess internationally recognized indigenous art traditions, including textile production, sculpture, weaving, metalwork, and cultural heritage crafts.

The target population comprised stakeholders directly involved in indigenous art value chains, including indigenous artists, craft entrepreneurs, gallery operators, cultural tourism practitioners, creative industry intermediaries, and supply chain actors involved in production, distribution, and commercialization activities. These stakeholder categories were selected because they collectively represent the major actors through whom intelligent supply chain practices influence cultural production and market sustainability.

A multi-stage sampling approach was adopted. Initially, purposive sampling was used to identify participants with direct involvement in indigenous art production and commercialization. Subsequently, convenience and snowball sampling techniques were employed to reach additional participants within creative clusters and cultural networks. This approach was considered appropriate because indigenous art value chains often operate through informal networks where complete sampling frames are unavailable.

Following recommendations for partial least squares structural equation modeling (PLS-SEM), the study targeted a sample size sufficient for testing complex models involving multiple constructs and mediation effects. A total of 468 valid responses were obtained, exceeding minimum sample requirements for PLS-SEM analysis and providing adequate statistical power for hypothesis testing (Hair et al., 2022).

3.3 Instrument Development and Measurement

Data were collected using a structured questionnaire developed from validated measurement scales in previous studies. The questionnaire consisted of five sections: demographic characteristics, supply chain intelligence measures, psychological mechanisms, sustainable indigenous art value chains, and respondent perceptions regarding digital transformation.

Supply chain intelligence was operationalized through dimensions including AI-enabled analytics, predictive capability, digital traceability, and market intelligence. Measurement items were adapted from previous research examining digital supply chain capabilities and intelligent technologies (Bag et al., 2021; Wamba et al., 2020).

Psychological mechanisms were measured through four dimensions: trust in intelligent systems, innovation readiness, perceived value, and cultural compatibility. These dimensions were adapted from technology acceptance, innovation readiness, and digital transformation literature (Davis, 1989; Parasuraman, 2000; Venkatesh et al., 2003).

Sustainable indigenous art value chains were measured using indicators capturing economic sustainability, cultural preservation, market resilience, and social inclusion. Items were developed based on sustainable creative economy and cultural development literature (Duxbury et al., 2021; UNESCO, 2023).

All measurement items were assessed using a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree.

3.4 Data Analysis Procedure

Data analysis was conducted using Statistical Package for the Social Sciences (SPSS) version 29 and SmartPLS 4. SPSS was employed for preliminary data screening, descriptive statistics, demographic analysis, and assessment of normality and missing data patterns. SmartPLS 4 was utilized for structural equation modeling because of its suitability for exploratory theory development, complex models, and mediation analysis involving multiple latent variables (Hair et al., 2022).

The analysis followed a two-stage approach. First, the measurement model was evaluated through assessment of internal consistency reliability, convergent validity, and discriminant validity. Reliability was assessed using Cronbach's alpha and composite reliability values, while convergent validity was examined through average variance extracted (AVE). Discriminant validity was assessed using the Fornell–Larcker criterion and heterotrait–monotrait ratio (HTMT).

Second, the structural model was evaluated by examining path coefficients, coefficient of determination (R^2), effect sizes (f^2), predictive relevance (Q^2), and statistical significance using bootstrapping procedures. Mediation analysis was conducted to determine whether psychological mechanisms significantly mediated the relationship between supply chain intelligence and sustainable indigenous art value chains.

3.5 Ethical Considerations

Ethical principles were observed throughout the research process. Participation was voluntary, and respondents were informed about the purpose of the study before completing the questionnaire. Confidentiality and anonymity were maintained, and collected information was used strictly for academic purposes. Given the cultural sensitivity surrounding indigenous artistic knowledge, particular attention was given to respecting community ownership, cultural identity, and intellectual property considerations.

4. RESULTS AND FINDINGS

4.1 Respondent Demographic Profile

A total of 468 valid responses were obtained from indigenous art value-chain stakeholders across Nigeria, Ghana, and Benin. The respondents comprised indigenous artists, craft entrepreneurs, gallery operators, cultural tourism practitioners, and supply-chain intermediaries involved in the production, promotion, distribution, and commercialization of indigenous artworks.

The demographic profile indicates substantial representation across different stakeholder categories, providing a balanced perspective of the indigenous art ecosystem. Indigenous artists and craft entrepreneurs constituted the largest proportion of respondents, reflecting their central role in creative production activities. Gallery operators and cultural intermediaries provided insights into market access, consumer engagement, and commercialization processes, while supply-chain actors contributed perspectives regarding distribution networks, traceability, and digital transformation.

The geographical distribution demonstrates representation from three important West African creative economies, enabling examination of SCI adoption within diverse cultural and institutional environments.

Table 1: Respondents' Demographic Characteristics (n = 468)

Category	Frequency	Percentage (%)
Country		
Nigeria	238	50.9
Ghana	132	28.2
Benin	98	20.9
Stakeholder Category		

Indigenous artists	186	39.7
Craft entrepreneurs	112	23.9
Gallery operators	58	12.4
Cultural tourism practitioners	61	13.0
Supply-chain intermediaries	51	10.9
Years of Experience		
Below 5 years	76	16.2
5–10 years	151	32.3
11–20 years	163	34.8
Above 20 years	78	16.7
Digital Technology Exposure		
Low	89	19.0
Moderate	214	45.7
High	165	35.3

The demographic distribution indicates that respondents possessed adequate practical experience and exposure to indigenous art value-chain activities. Importantly, the majority reported moderate-to-high levels of digital technology exposure, suggesting sufficient awareness of intelligent technologies to evaluate SCI-related constructs.

4.2 Measurement Model Assessment

The measurement model was evaluated using SmartPLS 4 through assessment of indicator reliability, internal consistency reliability, convergent validity, and discriminant validity. Following recommended PLS-SEM procedures, construct reliability was assessed using Cronbach's alpha (α) and composite reliability (CR), while convergent validity was evaluated through average variance extracted (AVE).

All constructs exceeded the recommended threshold values, demonstrating satisfactory measurement properties. Cronbach's alpha values ranged between 0.86 and 0.93, while composite reliability values ranged between 0.89 and 0.95, exceeding the minimum acceptable value of 0.70. Furthermore, all AVE values exceeded 0.50, confirming adequate convergent validity.

Table 2: Reliability and Convergent Validity Assessment

Construct	Cronbach's α	Composite Reliability	AVE
Supply Chain Intelligence	0.91	0.94	0.71
Trust in Intelligent Systems	0.88	0.92	0.69
Innovation Readiness	0.86	0.90	0.64
Perceived Value	0.90	0.93	0.72
Cultural Compatibility	0.87	0.91	0.67
Sustainable Indigenous Art Value Chains	0.93	0.95	0.74

Discriminant validity was assessed using the heterotrait–monotrait ratio (HTMT). All HTMT values were below the conservative threshold of 0.85, confirming that the constructs represented conceptually distinct dimensions.

4.3 Structural Model Assessment

The structural model was evaluated by examining the explanatory power (R^2), predictive relevance (Q^2), effect sizes (f^2), and path coefficients. The results indicate that supply chain intelligence significantly explained variations in sustainable indigenous art value chains.

The model produced an R^2 value of 0.61 for sustainable indigenous art value chains, indicating that SCI and psychological mechanisms jointly explained approximately 61% of the variance in sustainability outcomes. Similarly, psychological mechanisms recorded an R^2 value of 0.48, demonstrating that SCI significantly influenced stakeholders' trust, readiness, perceived value, and cultural compatibility.

The predictive relevance assessment indicated acceptable Q^2 values above zero, suggesting that the model possessed predictive capability.

Table 3: Structural Model Evaluation

Endogenous Construct	R^2	Q^2
Psychological Mechanisms	0.48	0.31
Sustainable Indigenous Art Value Chains	0.61	0.39

These findings demonstrate that intelligent supply chain capabilities provide meaningful explanatory power in predicting sustainable outcomes within indigenous art ecosystems.

4.4 Hypothesis Testing

Hypotheses were tested using bootstrapping procedures with 5,000 resamples in SmartPLS 4. The significance of relationships was determined through path coefficients, t-values, and p-values.

Table 4: Direct Effects and Hypothesis Testing

Hypothesis	Relationship	β	t-value	p-value	Decision
H1	SCI → Sustainable Indigenous Art Value Chains	0.641	14.82	<0.001	Supported
H2	SCI → Psychological Mechanisms	0.693	18.41	<0.001	Supported
H3	Psychological Mechanisms → Sustainable Indigenous Art Value Chains	0.287	6.21	<0.001	Supported

The findings indicate that supply chain intelligence has a strong positive influence on sustainable indigenous art value chains ($\beta = 0.641$, $p < 0.001$). Furthermore, SCI significantly influences psychological mechanisms ($\beta = 0.693$, $p < 0.001$), suggesting that intelligent technologies enhance stakeholder confidence, readiness, and perceived value. Psychological mechanisms also demonstrate a significant positive relationship with sustainability outcomes ($\beta = 0.287$, $p < 0.001$).

4.5 Mediation Analysis

The mediating effect of psychological mechanisms was examined using bootstrapped indirect effects. Results indicate that psychological mechanisms significantly mediate the relationship between supply chain intelligence and sustainable indigenous art value chains.

Table 5: Mediation Analysis

Relationship	Indirect Effect (β)	t-value	p-value	Mediation
SCI → Psychological Mechanisms → Sustainable Indigenous Art Value Chains	0.199	5.74	<0.001	Partial Mediation

The mediation results demonstrate that while SCI directly contributes to sustainable indigenous art value chains, part of its influence occurs through psychological mechanisms. This suggests that technological capabilities generate stronger sustainability outcomes when stakeholders perceive intelligent systems as trustworthy, valuable, culturally appropriate, and manageable.

5. DISCUSSION OF FINDINGS

This study examined how supply chain intelligence influences sustainable indigenous art value chains in West Africa, while investigating the mediating role of psychological mechanisms involving trust in intelligent systems, innovation readiness, perceived value, and cultural compatibility. The findings provide empirical support for the proposed socio-technical framework by demonstrating that technological capabilities alone do not determine sustainability outcomes; rather, the effectiveness of intelligent supply chain systems depends on how stakeholders interpret, accept, and integrate these technologies within culturally embedded creative ecosystems.

5.1 Supply Chain Intelligence and Sustainable Indigenous Art Value Chains

The findings reveal that supply chain intelligence has a significant positive effect on sustainable indigenous art value chains, supporting H1. This result confirms the argument that intelligent technologies can extend beyond conventional operational improvements to facilitate broader sustainability outcomes within creative ecosystems. The finding aligns with the Resource-Based View (RBV), which suggests that organizations achieve competitive advantage by developing valuable and difficult-to-imitate capabilities (Barney, 1991). In this study, SCI represents such a capability because it enables indigenous art stakeholders to transform fragmented information resources into actionable knowledge for improved production planning, market access, and value creation.

The strong relationship between SCI and sustainability outcomes indicates that AI-enabled analytics, digital traceability, and market intelligence can address longstanding challenges within indigenous art value chains. Historically, many indigenous creative enterprises have operated through informal networks characterized by limited market visibility, weak distribution systems, and inadequate mechanisms for product authentication. Intelligent supply chain systems provide opportunities to overcome these constraints by improving transparency, connecting producers with consumers, and enhancing confidence in culturally significant products.

This finding extends previous supply chain intelligence research, which has largely concentrated on manufacturing and industrial contexts, by demonstrating its relevance within cultural and creative industries. While previous studies have emphasized efficiency, resilience, and operational performance as primary benefits of digital supply chains (Bag et al., 2021; Wamba et al., 2020), this study expands the discussion by showing that intelligent supply chains can also support cultural sustainability, heritage preservation, and creative entrepreneurship.

Within the West African context, the implication is particularly significant because indigenous art represents both an economic resource and a cultural knowledge system. Therefore, the application of SCI should not be viewed merely as a mechanism for commercialization but as an enabling infrastructure for preserving cultural authenticity while expanding market opportunities.

5.2 Supply Chain Intelligence and Psychological Mechanisms

The findings further demonstrate that SCI significantly influences psychological mechanisms, supporting H2. This suggests that exposure to intelligent supply chain capabilities shapes how stakeholders perceive, evaluate, and respond to technological transformation. The finding supports technology adoption perspectives, particularly the argument that technology acceptance depends on cognitive assessments regarding usefulness, trust, compatibility, and perceived control (Davis, 1989; Venkatesh et al., 2003).

The relationship between SCI and psychological mechanisms highlights an important dimension often overlooked in digital transformation research. Technology is frequently presented as an objective capability; however, adoption occurs through human interpretation. Within indigenous art ecosystems, stakeholders do not simply assess AI systems according to technical performance but also consider whether these systems respect cultural values, enhance creative autonomy, and provide meaningful benefits.

The positive influence of SCI on trust and innovation readiness suggests that intelligent technologies can reduce uncertainty when stakeholders observe practical benefits such as improved market information, authentication processes, and consumer engagement. This finding supports the argument that digital transformation is fundamentally a socio-technical process requiring alignment between technological infrastructure and human capability.

5.3 Psychological Mechanisms and Sustainable Indigenous Art Value Chains

The significant relationship between psychological mechanisms and sustainable indigenous art value chains supports H3. This finding demonstrates that stakeholder perceptions are not peripheral issues but central determinants of sustainability outcomes. In particular, trust, readiness, perceived value, and cultural compatibility influence whether intelligent technologies are effectively integrated into creative practices.

The finding reinforces the Theory of Planned Behavior (Ajzen, 1991), which proposes that behavioural intentions are shaped by attitudes, social influences, and perceived behavioural control. In the context of indigenous art value chains, stakeholders who perceive AI-enabled systems as beneficial, manageable, and culturally appropriate are more likely to engage with digital transformation initiatives.

The importance of cultural compatibility is particularly noteworthy. Unlike conventional commercial supply chains, indigenous art ecosystems are deeply connected to identity, heritage, and collective memory. Therefore, sustainability requires more than technological efficiency; it requires technologies that preserve cultural meaning and empower communities. This finding contributes to creative economy scholarship by demonstrating that psychological acceptance and cultural alignment are essential conditions for sustainable digital transformation.

5.4 Mediating Role of Psychological Mechanisms

The mediation analysis confirms H4 by demonstrating that psychological mechanisms partially mediate the relationship between SCI and sustainable indigenous art value chains. This finding represents one of the study's most important contributions because it explains how and why intelligent supply chain capabilities generate sustainability outcomes.

While SCI provides technological opportunities, stakeholders' psychological responses determine whether those opportunities are converted into meaningful practices. These finding challenges purely technology-centred perspectives that assume digital innovation automatically produces positive outcomes. Instead, it supports a socio-technical perspective in which technological capabilities and human behaviour interact to shape transformation outcomes.

The mediating role of psychological mechanisms also extends RBV by demonstrating that technological resources require behavioural capability for effective utilization. In other words, SCI may represent a valuable organizational resource, but its strategic value depends on stakeholders' willingness and ability to deploy it effectively.

For policymakers and cultural organizations in West Africa, this finding implies that investments in digital infrastructure should be accompanied by capacity building, awareness creation, trust development, and culturally sensitive technology design. Without these psychological and institutional foundations, intelligent systems may remain underutilized despite their technical potential.

5.5 Theoretical Contribution

The study contributes to existing literature in three ways. First, it extends supply chain intelligence research beyond industrial applications by demonstrating its relevance within indigenous creative ecosystems. Second, it integrates RBV and TPB to provide a more comprehensive explanation of technology-driven sustainability outcomes. Third, it introduces psychological mechanisms as an explanatory pathway linking intelligent technologies with sustainable cultural value creation.

By positioning indigenous art value chains as socio-technical ecosystems, the study advances understanding of how AI-enabled transformation can support both economic development and cultural sustainability within emerging economies.

6. CONCLUSION, IMPLICATIONS AND FUTURE RESEARCH DIRECTIONS

6.1 Conclusion

This study examined the relationship between supply chain intelligence and sustainable indigenous art value chains in West Africa, while investigating the mediating role of psychological mechanisms involving trust in intelligent systems, innovation readiness, perceived value, and cultural compatibility. Drawing from the Resource-Based View and Theory of Planned Behavior, the study developed and empirically tested a socio-technical framework explaining how intelligent supply chain capabilities contribute to sustainable cultural value creation.

The findings demonstrate that supply chain intelligence significantly enhances sustainable indigenous art value chains by improving market visibility, traceability, decision-making capability, and stakeholder connectivity. The results further reveal that technological capability alone does not fully explain sustainability outcomes. Instead, psychological mechanisms serve as an important pathway through which stakeholders interpret, accept, and operationalize intelligent technologies within culturally embedded creative environments.

The study contributes to emerging discussions on artificial intelligence, supply chain transformation, and the creative economy by shifting attention from conventional industrial applications toward indigenous cultural ecosystems. Specifically, it demonstrates that intelligent supply chain systems can simultaneously support economic sustainability, cultural preservation, and social inclusion when implemented through stakeholder-centred approaches.

The West African context provides an important contribution because indigenous art value chains often operate within informal, fragmented, and culturally sensitive environments. The study shows that digital transformation in such settings requires more than technological investment; it requires alignment between intelligent systems, stakeholder capabilities, and cultural values. Therefore, sustainable digital transformation should be understood as a socio-cultural process in which technology enables value creation while respecting indigenous knowledge and creative identity.

Overall, the study concludes that supply chain intelligence represents a strategic capability for strengthening indigenous art ecosystems, but its sustainability impact depends significantly on the psychological readiness and cultural acceptance of stakeholders.

6.2 Theoretical Implications

This study offers several theoretical contributions. First, it extends the application of the Resource-Based View by demonstrating that intelligent supply chain capabilities can function as strategic resources within cultural and creative industries. Previous RBV applications have largely focused on manufacturing, logistics, and organizational competitiveness; however, this study illustrates that digital intelligence can also enhance value creation within indigenous creative ecosystems by improving access to information, market coordination, and cultural product visibility.

Second, the study contributes to technology adoption literature by integrating psychological mechanisms into the relationship between digital capability and sustainability outcomes. While existing technology adoption models emphasize factors such as perceived usefulness and behavioural

intention, this research extends the discussion by incorporating cultural compatibility as an important consideration in indigenous contexts. This suggests that technology acceptance is not only determined by technical functionality but also by whether innovations align with community values and identity structures.

Third, the integration of RBV and TPB provides a broader theoretical explanation of intelligent transformation. RBV explains why supply chain intelligence represents a valuable capability, whereas TPB explains how stakeholder attitudes, perceptions, and behavioural intentions influence the realization of that capability. The combined framework therefore advances a more holistic understanding of digital transformation as both a technological and human-centred phenomenon.

Finally, the study contributes to creative economy scholarship by positioning indigenous art value chains as dynamic ecosystems where technological innovation, cultural sustainability, and stakeholder behaviour interact. This perspective challenges purely commercial interpretations of creative industries by emphasizing the importance of heritage protection and community participation.

6.3 Practical and Policy Implications

The findings provide important implications for policymakers, cultural institutions, creative entrepreneurs, and technology developers seeking to strengthen indigenous art ecosystems.

For government agencies and policymakers, the study highlights the need to develop digital transformation policies that recognize indigenous creative industries as strategic components of economic development. Investment in broadband infrastructure, digital literacy programmes, creative industry innovation hubs, and supportive intellectual property frameworks can improve the ability of indigenous artists to participate in digital markets.

For cultural institutions and heritage organizations, the findings emphasize the importance of adopting intelligent technologies that enhance visibility and authenticity while protecting cultural ownership. Digital provenance systems, AI-supported cataloguing platforms, and ethical data governance mechanisms can strengthen trust among artists, consumers, and cultural stakeholders.

For indigenous artists and creative entrepreneurs, SCI provides opportunities to improve market intelligence, access international consumers, manage inventory, and build sustainable income streams. However, successful adoption requires continuous learning and willingness to engage with emerging digital tools.

For technology providers, the findings suggest that AI solutions for cultural industries should be designed with sensitivity toward indigenous knowledge systems. Technologies should not simply optimize commercial transactions but should incorporate features that support cultural authenticity, community participation, and ethical commercialization.

For development agencies and regional organizations, supporting digital capacity building among creative communities can contribute to inclusive economic growth while preserving cultural diversity across West Africa.

6.4 Limitations and Future Research Directions

Although this study provides valuable insights, several limitations should be acknowledged. First, the cross-sectional research design limits the ability to establish long-term causal relationships between supply chain intelligence adoption and sustainability outcomes. Future studies could employ longitudinal designs to examine how intelligent supply chain capabilities evolve over time and influence creative ecosystem development.

Second, the study relied on self-reported perceptions from stakeholders, which may introduce common method bias. Future research could combine survey data with objective indicators such as digital platform usage records, sales performance data, export outcomes, and supply chain efficiency measures.

Third, although the study covered Nigeria, Ghana, and Benin, West Africa contains diverse cultural contexts and indigenous creative traditions. Future

studies could expand the geographical scope to include additional African regions and undertake comparative analyses examining how institutional environments influence AI adoption within cultural industries.

Fourth, future research could investigate additional factors influencing intelligent transformation, including regulatory frameworks, digital governance, cyber security concerns, intellectual property protection, and ethical issues surrounding AI-generated cultural content.

Finally, qualitative investigations involving indigenous artists, community leaders, and cultural custodians could provide deeper understanding of how communities negotiate the relationship between technological innovation and cultural preservation.

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