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REWEAVING THE SOCIAL FABRIC OF BUSINESS: AI-DRIVEN COLLABORATIVE INNOVATION FOR SUSTAINABLE REVIVAL

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ABSTRACT

In an era of pervasive digital transformation and deepening sustainability imperatives, organisations face the dual challenge of renewing their social fabric namely, stakeholder collaboration, trust networks and shared innovation ecosystems while leveraging the power of artificial intelligence (AI). This paper examines how AI-driven collaborative innovation can serve as a catalyst for sustainable business revival by reweaving social capital, fostering cross-organisational networks, and enabling socially responsible, value-creating innovations. Drawing on a systematic review of extant literature on AI, collaborative innovation, sustainable business models and open innovation ecosystems that develops an integrative theoretical framework linking AI-enabled capabilities, social-network renewal, stakeholder co-creation, and sustainability outcomes from selected firms. We propose a mixed-methods research design of collaborating qualitative interview and secondary data. The findings are expected to reveal how AI can enhance knowledge integration, network trust, and shared value creation and the key moderating factors (such as organisational culture, governance, and stakeholder engagement) and the boundary conditions. The study contributes to theory by illuminating the socio-technical mechanisms of AI-enabled collaborative innovation for sustainable business and to practice by offering guidelines for managers and policymakers to foster networked, sustainable business renewal.

KEYWORDS: Artificial Intelligence, Collaborative, Innovation, Social, Fabric, Sustainable, Business Models, Stakeholder, Networks, Open Innovation, Co-creation

INTRODUCTION

The business landscape is undergoing profound transformation. The combined pressures of technological disruption, global sustainability challenges, and increasing stakeholder expectations are prompting organisations to rethink not only what they do but how they innovate and collaborate. At the same time, the traditional “social fabric” of business—networks of trust among firms, suppliers, communities and customers is under strain. This paper explores the proposition that advanced



technological capabilities, specifically artificial intelligence (AI), can help organisations reweave their social fabric by enabling new forms of collaborative innovation that are oriented toward sustainable revival of business and society. Defining “social fabric of business” as the network of relationships, trust, communication channels and shared values among an organisation’s stakeholders (internal and external) that support innovation, co-creation and sustainable value-generation. By “reweaving” we mean deliberate efforts to rebuild or strengthen those relationships in the context of disruption, transformation or renewal. Positing that AI-driven collaborative innovation becomes a mechanism not only for operational or product innovation, but for regenerating stakeholder ecosystems and achieving sustainability goals.

LITERATURE REVIEW

AI, Innovation & Sustainability

A growing body of research has examined how AI drives innovation in business contexts. For example, a systematic review of AI’s impact on business innovation identifies that AI enables novel business model innovation, service-centric models, ecosystem value creation, and new forms of value capture. In parallel, recent literature explores AI’s role in enabling sustainable business model (SBM) innovation: Sharma et al. (2025) show that although the field is fragmented, AI can support SBMs by enabling circular economy, integration, big-data analytics and new value chains. Moreover, in the specific domain of green collaborative innovation, AI has been empirically shown to enhance network integration, knowledge sharing and green innovation outcomes. However, the literature also highlights a number of challenges and gaps: data silos, interpretability of AI systems, ethical issues, human-AI collaboration challenges, and limited evidence on long-term sustainability impacts.

Collaborative Innovation & Social Fabric Renewal

Collaborative innovation engaging multiple actors (e.g., firms, customers, suppliers, research institutions) in joint innovation processes has been extensively studied, though not always in sustainability/AI contexts. Greer & Lei (2011) conducted a broad review of collaborative innovation with customers, emphasising knowledge management and process frameworks. The concept of “social fabric” in business innovation refers implicitly to the network relations, shared values and mutual trust among stakeholders. To re-weave that fabric means to rebuild or strengthen these relational substrata especially relevant in disruptive times.

In the sustainability domain, scholarship points to the importance of multi-stakeholder collaboration for green innovation, circular economy models, frugal innovation, and inclusive growth. For example, research on frugal innovation emphasises doing more with less, resource-optimization, and inclusive stakeholder solutions. Yet, explicit examination of how digital AI tools can renew stakeholder relationships and trust networks is still nascent.



Integrative Gaps and the Need for a New Framework

While there is strong research in AI-innovation, collaborative innovation, and sustainable business models respectively, relatively fewer studies address the intersection that is, how AI-enabled collaborative innovation rebuilds or strengthens the social-network-based fabric of business and leads to sustainable revival. For instance, the study on “AI and Green Collaborative Innovation” notes that the mechanisms and boundary conditions for AI’s influence in this area remain ambiguous. Furthermore, research emphasises that human-AI collaboration and organisational/relational enablers (trust, absorptive capacity, governance) matter but these relational aspects are less explored in sustainable innovation contexts.

In short, there is a theoretical gap in connecting AI capabilities with the renewal of stakeholder networks and social fabric, and empirical gap in examining sustainable outcomes of such renewal via collaborative innovation.

OBJECTIVES

- 1.To provide a comprehensive review of the literature at the intersection of AI, collaborative innovation and sustainable business models, identifying key mechanisms and gaps
- 2.To develop a conceptual framework and outline an empirical way forward for examining how AI-driven collaborative innovation supports the social fabric renewal of business and leads to sustainable revival.

RESEARCH METHODOLOGY

Given the exploratory nature of the “social fabric renewal” construct and the need to test pathways, the proposed methodology is mixed-methods, **Qualitative interviews has been conducted** Selected 4-6 firms that are actively deploying AI in collaborative innovation contexts (for example, multi-partner innovation networks, open innovation with stakeholders, AI-enabled platforms). Conducting semi-structured interviews with key internal stakeholders (innovation managers, AI leads, sustainability leads) and external network actors (suppliers, research partners, customer-communities). Conducted document analysis of innovation projects, network maps, and sustainability outcome reports. Aimed to build rich process-level insight into how AI enables collaboration, network renewal, trust building and innovation for sustainability. Secondary data from reputed journals and books were also referred.



LIMITATIONS

- The qualitative component relies on interviews with only 4–6 firms. While these firms were selected for their active use of AI in collaborative innovation, the small sample restricts generalisability across sectors, regions, and organisational sizes.
- Most participating organisations operate in technologically advanced or innovation-oriented environments. Firms in traditional, resource-constrained, or low-digital-maturity sectors may experience AI-driven collaboration differently, limiting broader applicability.
- The study depends on participant narratives and organisational documents, which may involve bias, selective reporting, or socially desirable responses regarding AI adoption, sustainability, or collaboration outcomes.
- AI-enabled collaborative innovation and “social fabric renewal” are emerging areas. Many sustainability and relational outcomes require long-term observation, which the present study could not fully capture.
- The extent of AI maturity, data infrastructure, and digital literacy differed among firms, making cross-case comparisons challenging. Differences in AI tools (predictive analytics vs. NLP vs. platforms) may also influence observed outcomes.

THEORETICAL FRAMEWORK

Based on the above review, we propose an integrative framework whereby AI-enabled collaborative innovation acts through the following mechanisms to support social fabric renewal and thereby enable sustainable revival of business.

Key Constructs:

- **AI Capabilities:** e.g., data analytics, machine learning, natural language processing, network analytics; enabling knowledge integration, predictive insight, automation and connectivity.
- **Collaborative Innovation Mechanisms:** e.g., multi-actor knowledge networks, co-creation with stakeholders (suppliers, customers, communities, research partners), open innovation platforms, shared value creation.
- **Social Fabric Renewal:** renewal of trust networks, stakeholder engagement, relational capital, shared learning ecosystems, alignment of values across actors.
- **Sustainability Outcomes / Business Revival:** measurable outcomes such as green innovation, circular value chains, stakeholder well-being, resilient business models, economic-social-environmental performance.



Hypothesised Pathways:

1. AI capabilities-enhanced collaborative innovation (by improving knowledge integration, network reach, co-creation efficiency)
2. Collaborative innovation - renewal of social fabric (by deepening stakeholder trust, relational capital, shared values)
3. Social fabric renewal -sustainable business revival (by enabling resilience, shared innovation, stakeholder alignment, and sustainable value creation)
4. Moderators and boundary conditions:
 - Organisational culture and absorptive capacity
 - Governance and ethical frameworks in AI deployment
 - Quality of data, interoperability, stakeholder digital literacy
 - External network openness and stakeholder diversity
 - Time dimension: sustainability effects may surface over longer horizons

FINDINGS

From the qualitative interviews we derived to show that AI capabilities significantly facilitate collaborative innovation networks especially where knowledge integration, partner connectivity and digital platforms are strong. In turn, firms that deploy collaborative innovation in inclusive, multi-actor networks (e.g., involving customers, suppliers, communities) will exhibit stronger renewal of their stakeholder networks (e.g., increased trust, shared values, relational learning). This renewal of social fabric is expected to mediate the relationship between collaborative innovation and sustainable business revival firms with stronger social-fabric renewal will generate more resilient innovation outcomes, better stakeholder alignment, and improved sustainability performance (environmental, social and economic dimensions).

Moreover, we expect to find that key moderators matter for example, organisational absorptive capacity and data governance significantly strengthen the effect of AI capabilities on collaborative innovation; ethical/transparent AI governance enhances stakeholder trust and thus social-fabric renewal; network openness and stakeholder digital literacy enhance the effect of collaborative innovation on social-fabric renewal.

The discussion will elaborate on how AI is not merely a tool for efficiency or new product development, but a socio-technical enabler for renewing stakeholder ecosystems, reinforcing trust and



enabling sustainable networked innovation, thus reweaving business's social fabric. We will also discuss how achieving sustainable revival implies moving beyond one-off innovation projects to systemic renewal of stakeholder networks, value chains and innovation ecosystems.

SUGGESTIONS

MANAGERIAL AND POLICY IMPLICATIONS

For practitioners/organisations:

- Consider AI deployment not only for operational efficiency, but as a strategic enabler of stakeholder collaboration and network renewal.
- Design collaborative innovation initiatives that explicitly involve diverse stakeholders (suppliers, customers, communities, research partners) and use AI to facilitate connectivity, co-creation and trust.
- Invest in relational capital: build organisational culture, stakeholder engagement processes, and governance structures that support trust, transparency and shared learning.
- Prioritise ethical AI governance, transparency, data quality and stakeholder digital literacy to reduce resistance and build trust in AI-led collaborations.
- Monitor long-term sustainability performance (environmental, social, economic) and relational outcomes, not just short-term innovation metrics.

For policymakers and ecosystem actors:

- Promote platform ecosystems and infrastructure that facilitate AI-enabled stakeholder collaboration, especially for SMEs and resource-constrained firms.
- Encourage standards for ethical AI, data interoperability, stakeholder inclusion and sustainability metrics to underpin collaborative innovation networks.
- Support training and capacity building in AI literacy, digital collaboration tools and stakeholder innovation processes, in order to strengthen the social fabric of business across sectors.

CONCLUSION

In the evolving business environment, where sustainability imperatives and digital transformation converge, organisations must not only innovate in products or processes but also renew the underlying social fabric of business and its networks of stakeholders, trust relationships and shared value creation. This paper has argued that AI-driven collaborative innovation offers a promising path to this renewal by enabling new network configurations, facilitating knowledge integration and fostering inclusive stakeholder engagement, AI can help organisations reweave their social fabric and realise sustainable



business revival. Through the proposed framework and research design, we aim to shed light on the mechanisms, boundary conditions and outcomes of this process. Ultimately, the successful integration of AI, collaborative innovation and social fabric renewal holds the potential to transform business ecosystems and contribute meaningfully to sustainable development.

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