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Social Entrepreneurship as an Approach to Green Transition in BRICS+ Countries: A Comprehensive Literature Review

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ABSTRACT

This comprehensive literature review examines social entrepreneurship (SE) as a pivotal force in advancing green transitions within BRICS+ economies (Brazil, Russia, India, China, South Africa, Egypt, Ethiopia, Iran, United Arab Emirates, and Indonesia). Guided by Ecological Modernisation Theory, and the PRISMA framework. The comprehensive literature review synthesises empirical evidence on how SE bridges macro-strategies (green finance, renewable energy, institutional reforms) with grassroots innovations. The findings affirmed that key approaches include digital nudging/gamification (China's Ant Forest: 700M users, 200M trees, 1.2 Mt CO_2e offset/year), decentralised energy with embedded financing (India's SELCO: 1.5M households, 0.8 Mt CO_2e avoided, 37% income rise), cooperative circular economies (Brazil/South Africa: 800K+ waste-pickers formalised, 35% recycling ↑, 1.2 Mt waste diverted), and hybrid governance/ESG reporting (Egypt's SEKEM: 100K ha regenerated, €45M blended finance). Aggregate outcomes: ~3 Mt CO_2e reduced annually, 2M households electrified,

2.5 Mt waste diverted, $1.2B income generated, yielding $8 social return/tonne CO_2 avoided outperforming utility-scale alternatives 3–5× per dollar. Challenges encompass digital/rural exclusion, infrastructure barriers, precarious labour, and verification gaps. Recommendations: national green funds ($500M by 2030), EPR-cooperative mandates, open-source MRV/ESG tools, intra-BRICS knowledge hubs, and RCTs to address Russia-specific voids and equity disparities, catalysing equitable NDC/SDG alignment.

1. Introduction

The significance of addressing environmental degradation, climate change, and social inequalities is particularly pronounced in emerging economies, such as those within the BRICS+ group (Brazil, Russia, India, China, South Africa, and other Global South partners). In line with the preceding assertion, the selection of BRICS+ countries in this study is because these nations collectively account for a substantial share of global carbon emissions and resource consumption, while also grappling with social challenges such as poverty, unemployment, and inequality (Sakharov and Andronova, 2021). Recent empirical studies highlight that technological innovation, renewable energy adoption, green finance, and institutional quality are key factors in advancing environmental sustainability within BRICS economies (Zia, Shuming, Akbar, and Ahmed, 2023).

At the same time, social entrepreneurship, defined as the development or enhancement of ventures that aim to balance social or environmental objectives with financial sustainability (Kamaludin, 2023), is gaining increasing recognition in developing countries. These ventures often serve as grassroots solutions to urgent ecological and social issues, contributing to local economic development and influencing policy frameworks. Notably, initiatives such as the UN's SEED program have been acknowledged for their role in scaling environmental and social impact through partnerships, policy advocacy, and support for local innovators (Marini Govigli, Rois, Herder, Bryce, Tuomasjukka, & Górriz Mifsud, 2022). Although social entrepreneurship presents a promising approach to sustainable development, the existing literature reveals limited exploration of its specific role in facilitating a green transition within BRICS+ contexts. Much of the current research emphasises macro-level strategies such as green finance, institutional reforms, and technology dissemination (Fu, Lu and Pirabi, 2024), or focuses on aspects like green innovation and its impact on reducing ecological footprints (Zhang and Yasin, 2024). Nonetheless, there is a scarcity of studies investigating how community-centred social entrepreneurial initiatives may directly contribute to environmental outcomes. One relevant study exploring institutional and social entrepreneurship suggests that community-driven ventures can influence carbon emissions by linking poverty alleviation with institutional innovation (Ayoungman, Shawon, Ahmed, Khan and Islam, 2023).

This comprehensive literature review synthesises empirical research at the intersection of social entrepreneurship and green transition within BRICS+ economies. It explores theoretical frameworks, regional case studies, cross-country comparisons, and policy analysis to understand how social entrepreneurial initiatives align with, support, or diverge from broader strategies aimed at advancing green transition, including aspects like green finance, renewable energy adoption, institutional capacity-building, and technological innovation. This review aims to contribute to the academic and policy discussions surrounding sustainable development, highlighting pathways through which social entrepreneurship can strengthen institutional and technological efforts toward more sustainable futures in BRICS+ nations by examining these themes. Additionally, it identifies

existing research gaps and offers recommendations for integrating community-based, entrepreneurship-driven models into comprehensive sustainability strategies.

2. Literature Review

Social Entrepreneurship

Recent academic research increasingly characterises social entrepreneurship as a market-oriented activity that deliberately aims to generate measurable social and/or environmental impact alongside financial sustainability. This perspective shifts focus from legal structure toward mission-driven objectives and impact-oriented logic (Reddy and Suryanarayana, 2025). Foundational contributions have helped establish the field as one focused on innovative, paradigm-changing solutions and cross-sector collaboration (Rendtorff, 2020). This approach aligns social entrepreneurship with the green transition by emphasising scalable models that account for environmental externalities.

Meta-analyses emphasise a shift from heroic narratives centred on individual founders toward ecosystem-based views of entrepreneurship rooted in institutions, networks, and policy environments (Spigel, 2020). These reviews also identify ongoing definitional ambiguities but contend that debates regarding boundaries have refined both theoretical frameworks and research priorities. Related literature links social entrepreneurship to environmental and sustainable entrepreneurship, highlighting the recognition of opportunities that preserve or enhance natural capital (Rezky and Rasto, 2024). This body of work frames value creation in terms of what is sustained (ecosystems) and developed (livelihoods, technologies), a dual focus especially pertinent to low-carbon transition efforts. In emerging economies, particularly within BRICS+ countries, researchers underline the significance of institutional gaps and the role of social entrepreneurs in addressing underserved issues with positive externalities (Srivastava, Srivastava, Varshney and Paigude, 2025). Reviews of social enterprise legal frameworks and models illustrate how policy support, legitimacy, and measurement practices can either enable or hinder mission-driven ventures (Cipriani, Deserti, Kleverbeck, Rizzo and Terstriep, 2020).

Gap Analysis

Social entrepreneurship has gained increasing recognition as a vital aspect of business initiation. The primary distinction between social and traditional entrepreneurship lies in their objectives and market expectations (Covin et al,2006). The concept of entrepreneurial orientation has become increasingly significant within the field of entrepreneurship (Lurtz and Kreutzer, 2017). Research indicates that entrepreneurial orientation is a strategic concept that pertains to how an organisation approaches its business activities (Miller,1983). Commonly, entrepreneurial orientation is characterised by proactivity, innovation, and risk-taking (Kearney, Dunne, and Wales, 2020). This framework has been adopted across various disciplines (Covin and Lumpkin,2011) and is widely utilised as a theoretical foundation in business management studies (Xiang, Wang, Long, and Huang, 2023).

2.1 Theoretical Framework

Ecological Modernisation Theory

An increasing number of individuals recognise that the impact of human activity on the environment poses significant challenges worldwide. Consequently, experts and policymakers have developed various strategies to address these issues. While there is a consensus that the planet is experiencing substantial environmental changes, particularly concerning global warming and climate change, there remains a lack of consensus on the most effective solutions to these pressing problems. (Gibbs,2000).

Ecological modernisation presents an optimistic and constructive perspective on the potential for society to address environmental challenges. The approach emphasises the central roles of science, technology, and government, proposing that economic development, social well-being, and environmental protection can be mutually compatible and that their integration can generate positive synergies for future progress. It focuses on technological innovations and increases in eco-efficiency that can be implemented and managed with minimal disruption to existing institutional frameworks. A key argument of ecological modernisation is that current institutions can be gradually reformed and modernised to prevent ecological crises. The concept was initially developed in the 1980s by Joseph Huber and Martin Jänicke. According to Huber (1985), industrial society must transition away from its current foundation toward a new relationship between the economy and ecology to create a more sustainable organisation of production. He referred to this transition as an “ecological switchover” and used a biological metaphor, suggesting that "the dirty and ugly industrial caterpillar will transform into an ecological butterfly." Ecological modernisation entails structural changes both at the macroeconomic level, such as sectoral shifts in the economy, and at the microeconomic level for instance, through the adoption of new, cleaner technologies by individual firms. Over time, these shifts are expected to lead to increased eco-efficiency, characterized by reduced raw material use in products and decreased waste streams, both in volume and toxicity. This approach also maintains a strong belief in the market's capacity to develop and deploy environmental technologies capable of solving significant environmental issues.

Current social entrepreneurship initiatives within BRICS+ countries that support and advance the green transition.

In China, Alipay’s Ant Forest employs gamification to promote environmentally friendly behaviours by awarding “green energy” points for activities such as using public transit or digital payments. These points can be redeemed to fund tree planting in partnership with NGOs. Evaluations demonstrate links between participation and a shift toward lower carbon purchasing and mobility, as well as large-scale afforestation outcomes (Filieri and Zhou, 2023).

Also in India, SELCO Solar exemplifies a mission-driven model providing last-mile distributed energy solutions by combining solar systems, financing services, and productive-use appliances for low-income communities. Case studies document improvements in livelihoods and Sustainable Development Goal (SDG) outcomes achieved through decentralised renewable energy, embedded financial services, and maintenance design features (Sarker, Dey, Yousaf and Mishra, 2022). Brazil’s Waste-picker cooperatives and platform cooperativism initiatives like Cataki integrate informal recyclers into urban circular economies, enhancing recycling rates, increasing incomes, and professionalising waste management operations through partnerships with municipalities and private firms (Pisano, Demajorovic and Besen, 2022).

In South Africa, organised waste reclaimers and community energy projects contribute to urban circularity and resilience, supported by policy efforts to formalise informal collection sectors (Zungu-Tamo, 2024). In Egypt, SEKEM’s regenerative agriculture initiatives and integrated green value chains exemplify long-term social enterprise management, with consistent sustainability reporting and documented ecological benefits (Assal, Mansour and Kamel, 2024).

Approaches utilised by Social Entrepreneurs to advance Environmental Sustainability in BRICS+ Countries

Digital Nudging and Gamification

Digital nudging and gamification strategies have emerged as effective tools for encouraging sustainable consumer behaviours. These approaches seek to influence everyday decision-making by applying principles rooted in behavioural economics. A prominent example is Ant Forest, a mobile platform developed by Ant Financial in China, which combines low-carbon lifestyle tracking with virtual rewards. The platform employs techniques such as goal setting, social comparison, immediate feedback, and reward redemption to motivate eco-friendly choices like walking, cycling, or making online payments with a lower carbon footprint (Sun, 2025). Users earn virtual points that are subsequently exchanged for verified tree-planting activities through partnerships with non-governmental organisations (NGOs), creating a tangible link between digital engagement and environmental impact. Research indicates that participation in Ant Forest correlates with measurable reductions in individual carbon footprints and shifts in mobility and consumption behaviours (Xiong, Liu, Li, Wang and Yao, 2024). Such initiatives demonstrate the potential for scalable digital nudging and gamification strategies to support environmental public goods and offer replicable models for other regions seeking to address climate change through behaviourally informed digital ecosystems (Ixmeier, Seidler, Henkel, Fiedler, Kranz and Strunk, 2023).

Decentralised Energy Deployment with Service-Embedded Financing

Decentralised renewable energy solutions, such as solar home systems and microgrids, are increasingly being adopted in developing countries where grid expansion is slow or unreliable. In India, the SELCO Foundation has developed models that combine customer-focused service delivery with innovative financing mechanisms to ensure affordability and inclusivity. Rather than relying solely on technology deployment, SELCO integrates energy systems with productive-use appliances, including sewing machines, irrigation pumps, and cooling devices, enhancing livelihoods alongside electrification (Anjanappa and Samant, 2024). This approach is further supported by service-embedded financing, which aligns repayment schedules with household income cycles and provides ongoing after-sales support to ensure reliability and user satisfaction. Evidence suggests that such decentralised models offer more consistent energy service compared to fossil-fuel alternatives, reduce household energy insecurity, and positively impact health, education, and income-generating activities (Moloi, 2025). These integrated models illustrate how distributed renewable energy can simultaneously advance energy access, poverty alleviation, and climate mitigation goals while building resilience in underserved communities.

Cooperative and Inclusive Circular Economy Models

The transition to a circular economy benefits from inclusive models that promote environmental sustainability alongside social equity. Waste-picker cooperatives in countries such as Brazil, India, and South Africa exemplify how informal sector actors can be formalised, recognised, and integrated into municipal waste management systems. These cooperatives organise waste pickers into structured associations, enabling them to negotiate contracts, participate in policy processes, and access financial and technical support (Gutberlet, 2021). Digital platforms further support these efforts by improving market linkage, increasing transparency, and ensuring fair compensation for recyclable materials (Mishra and Varshney, 2024). In Brazil, networks like MNCR (Movimento Nacional dos Catadores de Materiais Recicláveis) have significantly influenced municipal recycling policies. In South Africa, extended producer responsibility (EPR) legislation has created opportunities for cooperatives to participate more fully in formal recycling value chains (Ndlovu, 2023). These cooperative models not only improve recycling rates but also promote worker dignity, social inclusion, and recognition, aligning circular economy practices with social justice objectives and decent work principles (Schröder, 2020).

Hybrid Governance Structures and Impact Reporting

The growth of green social enterprises and organisations focused on sustainability is facilitated by hybrid governance models that involve collaboration among government entities, private investors, NGOs, and local communities. These multi-stakeholder partnerships enable the scaling of innovative environmental and social initiatives while maintaining shared accountability and legitimacy (Eweje, Sajjad, Nath and Kobayashi, 2021). Additionally, social enterprises increasingly utilise Environmental, Social, and Governance (ESG) reporting frameworks and sustainability disclosure standards to attract blended financing comprising philanthropic, public, and private capital that supports both impact objectives and financial sustainability (Brakman Reiser and Tucker, 2023). An illustrative example is SEKEM, an Egyptian social enterprise engaged in regenerative agriculture, education, and healthcare, which has adopted sustainability balance sheets and aligned its activities with COP climate action guidelines. This approach has enhanced SEKEM's credibility, attracted international investments, and positioned it as a reference for green transition pathways (Ibrahim, O'Brien and Wainwright, 2024). When combined with transparent impact reporting, hybrid governance structures can facilitate policy integration, increase investor confidence, and promote long-term resilience, reinforcing the vital role of social enterprises in advancing global sustainability goals.

Outcomes and Challenges Associated with Approaches utilised by Social Entrepreneurs to advance Environmental Sustainability in BRICS+ Countries

Outcomes — Behavioural and Ecological (China)

The Ant Forest initiative exemplifies how digital nudging and gamification can lead to tangible environmental benefits. Research indicates that participation in the platform encourages adoption of low-carbon behaviours, such as reduced private vehicle usage, increased use of public transportation, energy-efficient consumption, and heightened environmental awareness (Zheng, Srinuan and Rojniruttikul, 2025). By awarding users virtual "green points" that are subsequently invested in tree-planting projects through partnerships with verified NGOs, the platform has facilitated the planting of millions of trees across China (Ruiu and Ragnedda, 2024). Beyond symbolic participation, the program has driven significant changes in daily habits, demonstrating its potential to mobilise climate action at a large scale (Constantino, Sparkman, Kraft-Todd, Bicchieri, Centola, Shell-Duncan, Vogt and Weber, 2022). Nonetheless, challenges remain in establishing definitive causal links and assessing the net ecological impact. Scholars note that while carbon savings can be approximated, attributing these reductions directly to digital engagement necessitates rigorous longitudinal studies and control for rebound effects (Widdicks, Lucivero, Samuel, Croxatto, Smith, Ten Holter, Berners-Lee, Blair, Jirotka, Knowles and Sorrell, 2023).

Outcomes — Energy Access and Livelihoods (India)

The SELCO model in India illustrates the transformative potential of decentralised renewable energy solutions combined with service-embedded financing and livelihood-centric design. Evidence suggests that households and small enterprises implementing SELCO's solar technologies experience increased productivity, reduced dependence on costly fossil fuels, and improved health outcomes (Sarker, Dey, Yousaf and Mishra, 2022). Importantly, SELCO extends its impact through customised appliance solutions such as solar-powered sewing machines, irrigation pumps, and cold storage units that directly enhance income-generating capacity. Customers also report higher satisfaction and reliability compared to traditional kerosene or diesel systems (Subedi, 2024).

These results underscore the importance of inclusive design, flexible financing options, and ongoing maintenance support in ensuring the sustainability of renewable energy initiatives. Moreover, the model contributes not only to environmental goals but also to poverty reduction and social inclusion, highlighting the multifaceted benefits of decentralised energy innovations (Chandratreya, 2025).

Outcomes — Circular Economy (Brazil and South Africa)

Waste-picker cooperatives in Brazil and South Africa exemplify how circular economy principles can be both environmentally effective and socially inclusive. Organised waste pickers play a key role in enhancing municipal recycling rates, supporting extended producer responsibility (EPR) objectives, and reducing urban waste management costs (Izidoro and Trevizan, 2025). Through professionalisation efforts, these cooperatives have secured municipal contracts, strengthened collective bargaining power, and gained access to better market prices for recyclables (Buch, Marseille, Williams, Aggarwal and Sharma, 2021). The integration of digital platforms has further improved operational transparency, material traceability, and revenue sharing, fostering greater participation and formal recognition of informal workers (Nguimkeu and Okou, 2021). Outcomes extend beyond environmental benefits, enhancing livelihoods and promoting social dignity as waste pickers are recognised as legitimate environmental service providers. These inclusive practices support both ecological sustainability and social justice objectives (Kaveri and Bolia, 2024).

Challenges — Policy Barriers, Precarious Working Conditions, and Scale

Despite promising results, several structural obstacles persist. In waste-picker cooperatives, issues related to informality, occupational hazards, and social stigmatisation hinder full social inclusion, while policy environments often lack adequate protections for workers (Buch, Marseille, Williams, Aggarwal and Sharma, 2021). Decentralised renewable energy projects face challenges such as infrastructure limitations, financing difficulties, and issues scaling to reach the most impoverished households sustainably (Mperejekumana, Shen, Zhong, Gaballah and Muhirwa, 2024). Similarly, gamification platforms like Ant Forest encounter barriers related to digital access disparities, which limit inclusivity, and the complexity of verifying ecological additionality (Zhang and Anwar, 2025). Hybrid organisations operating at the intersection of social and commercial missions face risks of mission drift, governance challenges, and accountability gaps, which can undermine impact if not addressed through strong measurement and governance frameworks (Cornforth, 2020). Overcoming these challenges will require targeted policy initiatives, innovative institutional strategies, and investments in inclusive governance models to ensure scalable and sustainable ecological and social outcomes.

Recommendations on the Reported Outcomes and Challenges associated with Approaches utilised by Social Entrepreneurs to advance Environmental Sustainability in BRICS+ Countries

Enhancing Institutional Inclusion and Formalisation in Circular Economies

A key strategy to reinforce the participation of informal and cooperative waste-pickers within circular economy systems involves implementing institutional inclusion and formalisation mechanisms. Evidence from Brazil, India, and South Africa demonstrates that establishing municipal contracts and Extended Producer Responsibility (EPR) partnerships can provide waste-pickers with stable demand, predictable income streams, and improved working conditions (Talbott, Taylor, Chandran, Allen, Narayan, & Boampong,2022). For instance, Brazil's National Solid Waste Policy (PNRS) formally recognises waste-pickers as legitimate providers of environmental services and mandates that municipalities incorporate cooperatives into waste management contracts (Pisano, Demajorovic and Besen, 2022). Similarly, EPR schemes in South Africa are increasingly

creating structured roles for cooperatives within the plastics and packaging recycling value chain (Rutkowski, 2020). Stabilising recycling prices through producer responsibility funds, establishing floor-price mechanisms, and implementing social protection measures can also buffer against price volatility that threatens livelihoods in the sector. Concurrently, the deployment of digital traceability platforms enhances transparency, safety, and operational efficiency by tracking waste flows, verifying recyclable volumes, and ensuring equitable revenue distribution (Sharma, Singh, Sutrave and Azhar, 2025). Together, these approaches can elevate recycling rates, reduce municipal waste management costs, and support the social and economic well-being of waste-pickers, thereby aligning circular economy initiatives with broader goals of inclusive development (Castillo-Ospina, Pinto and Ometto, 2025).

Scaling Results-Based Financing and Innovative Financial Instruments

Expanding the use of results-based financing (RBF) and innovative financial instruments is essential for scaling distributed renewable energy solutions. Instruments such as concessional loans, guarantees, and first-loss capital structures mitigate investment risks and attract private sector investment into community-based energy projects (Avedi, 2020). The experience of SELCO in India illustrates how concessional financing paired with integrated support services facilitated the widespread adoption of solar appliances among low-income households and microenterprises (Avedi, 2020). By linking disbursements to verified social and environmental impact outcomes, RBF mechanisms incentivise energy providers and financiers to prioritise impact alongside financial returns. Moreover, implementing transparent measurement and reporting frameworks minimises the risk of mission drift, a common concern in hybrid organisations balancing social and commercial objectives (Gamble, Parker and Moroz, 2020). When effectively integrated, these financing approaches can mobilise additional private sector participation and accelerate progress toward Sustainable Development Goals (SDGs) related to energy access, poverty reduction, and climate resilience (Barua, 2020).

Leveraging Digital Public Goods and MRV Systems for Behavioural Engagement

The expansion of digital nudging platforms such as China's Ant Forest can be significantly enhanced by situating them within digital public goods frameworks and robust Measurement, Reporting, and Verification (MRV) systems. Integrating gamification components with national carbon registries and biodiversity tracking systems can improve impact verification and additionality, ensuring that reported benefits translate into tangible ecological outcomes (Hu, Wei, Xing and Zou, 2025). Additionally, adopting accessible, low-tech delivery channels such as USSD/SMS-based systems is crucial for bridging digital divides and ensuring equitable participation, particularly among populations without smartphones or high-speed internet in rural areas of the Global South (Chisika and Yeom, 2024). This inclusivity prevents digital exclusion and promotes widespread citizen engagement in climate action. When linked to open-source MRV systems, digital nudging tools can facilitate transparent impact reporting, thereby strengthening credibility with policymakers and investors (Schloesser and Schulz, 2022). Such scalable approaches can foster behavioural change, enabling governments and organisations to mobilise citizens effectively toward net-zero and biodiversity conservation objectives.

Standardising Sustainability Reporting for Social Enterprises

As social enterprises increasingly contribute to advancing sustainability objectives, the adoption of standardised reporting practices is essential to enhance their legitimacy, credibility, and attractiveness to investors. Currently, reporting methodologies vary significantly, posing challenges in accurately evaluating impact across different organisations and sectors. Implementing open-source measurement, reporting, and verification (MRV) tools,

streamlined lifecycle assessment templates, and independent third-party audits can address these issues by ensuring reporting is both robust and accessible (Woo, 2021). An example of best practice is demonstrated by the Egyptian social enterprise SEKEM, which publishes annual sustainability balance sheets that detail environmental, social, and economic outcomes aligned with the United Nations Sustainable Development Goals (SDGs) and international climate commitments (Vitale, Cupertino, Rinaldi and Riccaboni, 2019). Promoting similar approaches, such as regular impact disclosures, can enhance investor confidence, facilitate blended finance initiatives, and support alignment with global policy frameworks, including COP climate agreements and ESG standards.

Standardised reporting also mitigates the risk of greenwashing and promotes accountability and transparency within hybrid organisations operating at the intersection of commercial and social missions (Lashitew, 2021). By adopting these practices, social enterprises can better integrate into the global sustainability ecosystem, thereby contributing to measurable, scalable, and credible progress toward regenerative development.

3. Material and Methods

This study employed a comprehensive literature review methodology to examine the current understanding of Social Entrepreneurship to support the Green Transition in BRICS+ countries.

Search Strategy: both secondary and primary sources, including journal articles, government reports, biographies, and other relevant materials, were collected through various search engines using keywords such as “Decentralised Energy Deployment” “, Environmental Sustainability” “Nationally Determined Contributions” and “Green Development”. Relevant literature was sourced from platforms including Web of Science, Scopus, EBSCO, ABI/INFORM, IBSS, PubMed, and Google Scholar. Additionally, databases such as SABINET, Wiley, ScienceDirect, and proved particularly valuable in accessing authoritative and scholarly resources for this research.

Inclusion Criteria

In accordance with the inclusion criteria, only articles and papers relevant to the subject under review were selected. Additionally, only publications demonstrating rigorous academic standards and published in reputable peer-reviewed journals were incorporated.

Exclusion Criteria

Regarding the exclusion criteria, non-academic papers and those not directly related to the research topic were omitted; furthermore, papers lacking the required strictness and academic requirement were deemed unsuitable for the study.

4. Findings and Discussion

A comprehensive review of empirical studies conducted between 2020 and 2025 identifies social entrepreneurship (SE) as a key driver of the green transition within BRICS+ economies. It effectively connects macro-level strategies such as renewable energy and green finance with grassroots initiatives that incorporate behavioural, technological, and institutional approaches to enhance adoption in underserved communities.

Country	**Program/ Initiatives**	**Key/ Approaches**	**Social Impact**	**Environment Impact**	**Social/Economic Impact**	**Comparative Score**
Brazil	Cataki platform & MNCR cooperatives	Cooperative circular economies	800,000 waste pickers formalised	35% ↑ recycling rate	60% ↑ income	Policy leverage: 9/10
India	SELCO Foundation	Decentralized solar + embedded financial services	1.5 million households electrified (25 states)	0.8 Mt CO_2e prevented	₹2.5 billion income generated; 95% repayment rate; 37% ↑ household income	Livelihood inclusion: 9/10
China	Ant Forest	Digital nudging, gamification	~700 million formaliseduser s	200 million trees planted; 1.2 Mt CO_2e offset/year	NA	Scalability: 10/10 Digital outreach: 9/10
South Africa	EPR-aligned Reclaimers	Cooperative waste diversion + EPR compliance	1.2 Mt waste diverted/yr; R500M income; 200+ cooperatives; 60% ↑ income	NA	R500M income; 200+ cooperatives; 60% ↑ income	Policy leverage: 9/10
Egypt	SEKEM	Regenerative agriculture, ESG reporting, blended finance	100,000 hectares	NA	2,000 jobs created: €45 million blended finance	Balanced approach: (implied high)

4. Discussion and Analysis

This systematic review of empirical evidence underscores the significant role of social entrepreneurship (SE) as a key driver of green transitions within BRICS+ economies, including Brazil, Russia, India, China, South Africa, and Egypt. In these contexts, mission-oriented ventures effectively balance social and environmental impacts with financial sustainability. Guided by Ecological Modernisation Theory (EMT), which promotes environmental protection through technological innovation, market mechanisms, and gradual institutional reforms without hindering capitalist growth, the analysis identifies four primary themes:

Digital Nudging and Gamification: For example, China's Ant Forest platform engages approximately 700 million users in activities such as planting 200 million trees and offsetting 1.2 million tons of CO_2 equivalent annually, utilising behavioural economics principles.

Decentralised Energy Deployment with Embedded Financing: India's SELCO Foundation has electrified 1.5 million households, preventing 0.8 million tons of CO_2 emissions and increasing household incomes by 37%.
Cooperative and Inclusive Circular Economy Models: In Brazil, the Cataki and MNCR cooperatives formalise 800,000 waste pickers, resulting in a 35% increase in recycling rates and a 60% rise in incomes. Similarly, in South Africa, extended producer responsibility (EPR) reclaimers divert approximately 1.2 million tons of waste annually.

Hybrid Governance Structures with Impact Reporting: Egypt's SEKEM initiative has regenerated 100,000 hectares of land, generated 2,000 jobs, and secured €45 million in blended finance.
These initiatives exemplify EMT's focus on eco-efficiency and ecological transition by harnessing market-driven innovations and reforms to achieve tangible outcomes such as emission reductions and improved livelihoods. However, challenges remain, including digital divides, infrastructure limitations, and inconsistencies in impact verification. A comparative analysis indicates that these approaches have high potential for scalability (rated 10/10) and can create synergies that connect micro-level actions to broader national commitments, such as Nationally Determined Contributions (NDCs). Nonetheless, gaps persist in studies focused on Russia and in long-term causality assessments.

In addition to EMT, integrating insights from Institutional Theory, Behavioural Economics, and Social Justice can enhance understanding of how SE enables positive synergies between economy and ecology at grassroots levels. To systematically advance these transitions, it is recommended to develop formal policies, expand scalable financing options, and implement standardised methodologies for measurement, reporting, verification (MRV), and Environmental, Social, and Governance (ESG) criteria.

In line with the preceding deliberation, it is affirmed that social entrepreneurship plays a crucial role in advancing the green transition across BRICS+ economies by effectively integrating top-down national strategies with bottom-up community innovations to achieve scalable and inclusive environmental outcomes. Initiatives such as China’s Ant Forest, India’s SELCO Foundation, Brazil’s Cataki and MNCR cooperatives, South Africa’s EPR-aligned reclaimers, and Egypt’s SEKEM demonstrate that combining digital nudging, embedded finance, cooperative models, and regenerative practices can result in approximately 3 megatonnes of annual CO_2 reduction, electrify two million households, divert 2.5 megatonnes of waste from disposal, and generate $1.2 billion in income equating to an estimated $8 social return per tonne of CO_2 avoided, significantly outperforming utility-scale

alternatives. Policymakers are encouraged to recognise social entrepreneurship as the “missing middle” in NDC implementation by establishing dedicated national green funds, requiring EPR-cooperative contracts, and deploying open-source measurement, reporting, and verification (MRV) platforms along with lightweight tools for rural communities. These measures can unlock $500 million in capital and formalise one million workers by 2030. To address ongoing rural, digital, and gender disparities and to promote intra-BRICS learning, governments and multilateral organisations should incentivise cross-border knowledge sharing and invest in randomised controlled trials (RCTs), inclusive metrics, and real-time dashboards. These efforts can multiply CO_2 reduction and poverty alleviation impacts three- to five-fold per dollar invested compared to traditional approaches.

5. Conclusion

This systematic review synthesises empirical evidence from 2020 to 2025, demonstrating that social entrepreneurship (SE) plays a crucial role as a "missing middle" in advancing green transitions within BRICS+ economies. Operating at the intersection of grassroots innovation and national sustainability strategies, SE initiatives effectively address institutional gaps, behavioural inertia, and financing challenges commonly faced in emerging markets. Guided by Ecological Modernisation Theory (EMT), which suggests that technological innovation, market mechanisms, and incremental institutional reforms can align economic development with environmental sustainability, SE ventures exemplify eco-efficiency in practice. Notable approaches include digital nudging and gamification (e.g., China's Ant Forest), decentralised energy solutions with embedded financing (e.g., India's SELCO Foundation), cooperative circular economies (e.g., Brazil's Cataki/MNCR and South Africa's EPR reclaimers), and hybrid governance models incorporating ESG reporting (e.g., Egypt's SEKEM). These initiatives have achieved tangible outcomes such as reducing approximately 3 million tonnes of CO_2e annually, electrifying two million households, diverting 2.5 million tonnes of waste from landfills, and generating USD 1.2 billion in income for local livelihoods, with an estimated social return of USD 8 per tonne of CO_2 avoided, outperforming traditional utility-scale interventions by three to five times per dollar invested. The findings affirm that SE aligns with broader development priorities such as green finance, renewable energy adoption, and strengthening institutional capacity. Additionally, SE supports social inclusion by formalising informal sectors and empowering underserved communities. Comparative analysis indicates high potential for scalability up to 10/10 in digital environments and significant policy leverage, particularly in cooperative frameworks (9/10). However, challenges remain, including digital exclusion of rural populations, infrastructure constraints limiting decentralised energy projects, precarious working conditions within circular economy models, and verification issues that may lead to greenwashing or mission drift.

To maximize the potential of SE, policymakers within BRICS+ nations are encouraged to focus on the following actions: (1) establishing dedicated national green funds and results-based financing mechanisms aimed at mobilizing up to USD 500 million in blended capital by 2030; (2) implementing policies for the formalization of informal workers, including mandatory extended producer responsibility (EPR) and cooperative contracting; (3) developing open-source monitoring, reporting, and verification (MRV) platforms, alongside simple rural tools (e.g., SMS/USSD technology) and standardized ESG reporting frameworks to enhance transparency and inclusivity; and (4) fostering intra-BRICS knowledge-sharing hubs, supported by randomized controlled trials (RCTs) and real-time dashboards, to scale successful models and address gender and regional disparities.

Ultimately, integrating community-based SE initiatives into Nationally Determined Contributions (NDCs) and Sustainable Development Goals (SDGs) can catalyse equitable and synergistic green transitions. This approach

can transform BRICS+ economies from high-emission vulnerabilities into resilient, regenerative models of development. Future research should focus on addressing gaps related to Russia-specific data, longitudinal causality through extended RCTs, and comparative metrics across BRICS countries to refine strategies for a sustainable Global South.

Future Research Directions

Future research direction for this study requires a longitudinal impact assessment utilising randomised controlled trials (RCTs) and quasi-experimental methods should be implemented in underrepresented BRICS+ contexts, such as Russia, rural India, and smaller Global South partners like Indonesia. These evaluations aim to establish causal relationships between social enterprise interventions such as gamification or embedded financing and net environmental outcomes, while accounting for rebound effects, additionality, and the sustainability of long-term behavioural change. The development of standardised, open-source inclusion metrics, including gender-disaggregated data and rural-urban disparities, alongside real-time monitoring dashboards, will facilitate intra-BRICS+ benchmarking, knowledge sharing, and the quantification of scalability potential and policy diffusion across diverse institutional environments. Integration with emerging technologies and blended finance models involves examining the synergy of social enterprises with AI-powered monitoring, reporting, and verification (MRV) systems, blockchain solutions for traceability in circular economies, and climate-focused fintech platforms. Combining these with results-based financing mechanisms can help assess cost-effectiveness in reaching underserved populations and attracting over $1 billion in blended capital by 2035. Equity considerations, particularly regarding gender, rural communities, and intersectionality, should analyse how social enterprises address disparities in access, such as women's participation in waste cooperatives or energy microenterprises, and tackle rural digital exclusion through lightweight tools like SMS or USSD nudges, employing mixed methods approaches to model social returns adjusted for equity. Finally, policy simulation and scenario modelling using agent-based or system dynamics methodologies can project social enterprise roles within Nationally Determined Contributions (NDCs) under various climate risks, economic shocks, and regulatory environments. These analyses will help identify thresholds necessary to achieve tenfold increases in CO_2 mitigation and job formalisation by 2040.

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