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Energy Transition, Human Resource Innovativeness and Institutional Quality as Determinants of Sustainable Entrepreneurship in Developing and Emerging Economies

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Abstract

This article develops a systemic analytical framework for examining sustainable entrepreneurship in developing and emerging economies by integrating insights from energy economics, human resource management, and institutional analysis. The study addresses a key limitation of existing research, namely the fragmentation of explanations that treat energy transition, organisational capability, institutional quality, and entrepreneurship as separate determinants of development. Drawing on a conceptual synthesis of these domains, the article argues that sustainable entrepreneurship should be understood as an emergent outcome of coherent interactions between structural, organisational, and institutional dimensions.

At the structural level, energy transition reshapes production possibilities, investment incentives, and long-term growth trajectories. At the organisational level, human resource innovativeness mediates the capacity of firms to adapt to technological and environmental change. At the institutional level, governance quality conditions trust, financial stability, and long-term orientation, thereby influencing the feasibility of innovation and entrepreneurial activity. Entrepreneurship is conceptualised as an integrative mechanism through which these dimensions are translated into concrete economic outcomes.

The analysis demonstrates that energy transition alone is insufficient to generate sustainable development unless supported by adaptive organisational capabilities and credible institutional environments. The findings highlight the recursive nature of interactions between energy systems, organisational learning, and institutional quality, offering a systemic explanation for divergent development trajectories observed across countries. The article contributes to the literature by advancing a non-linear, system-oriented perspective on sustainable entrepreneurship and by providing policy-relevant insights into the coordination of energy, human capital, and institutional reforms.

Keywords: *sustainable entrepreneurship; energy transition; human resource innovativeness; institutional quality; developing economies; systemic development*

Introduction

Contemporary debates on economic development increasingly reveal the inadequacy of linear and sector-specific explanations of growth, particularly in the context of developing and emerging economies. Classical models that isolate energy supply, human capital, institutional quality or entrepreneurship as independent determinants of development fail to capture the structural interdependencies that define modern transition processes. Economic growth today unfolds at the intersection of energy transformation, organisational capability, and institutional integrity, forming a complex system in which technological, social and normative dimensions are inseparably intertwined.

One of the most persistent structural challenges faced by developing economies is the continued dependence of growth on energy-intensive production patterns. Empirical evidence demonstrates that economic expansion in these countries remains strongly coupled with fossil fuel consumption, exposing them simultaneously to environmental degradation, macroeconomic volatility and long-term sustainability risks. Recent analyses of transition pathways indicate, however, that this coupling is not inevitable. The diffusion of renewable energy technologies, combined with open market conditions, can fundamentally reconfigure growth trajectories by altering the cost structure, investment horizon and innovation incentives of economic systems (Bekun et al., 2025).

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Yet energy transition, understood merely as a technological substitution process, provides an analytically insufficient explanation of sustainable development. The capacity of economies to internalise renewable energy solutions depends critically on organisational and human factors. Firms operating in transition contexts must absorb new technologies, reorganise production processes and redefine strategic priorities under conditions of uncertainty. This adaptive capacity is largely determined by the innovativeness of human resource management systems, which shape learning processes, knowledge creation and behavioural flexibility within organisations. Human resource innovativeness thus emerges as a structural precondition for translating macro-level energy transformation into micro-level economic performance (Staniewski, 2011).

At the same time, both energy transition and organisational innovation are embedded within broader institutional environments that condition economic behaviour. Weak governance structures, corruption and low institutional trust distort incentives, undermine long-term planning and erode the financial foundations of development. Empirical research demonstrates that corruption exerts a direct and statistically significant negative effect on domestic savings, thereby constraining capital accumulation and limiting the capacity of economies to finance innovation and sustainable investment from internal sources (Abu & Staniewski, 2022). In such contexts, even technologically feasible and organisationally viable development strategies may fail due to institutional fragility.

Entrepreneurship occupies a pivotal position within this constellation of factors. It constitutes the mechanism through which structural conditions, organisational capabilities and individual agency are integrated into concrete economic action. However, entrepreneurial activity itself is not socially neutral. It is shaped by socioeconomic determinants that influence risk perception, opportunity recognition and strategic orientation. Empirical studies indicate that socioeconomic background plays a decisive role in shaping entrepreneurial intentions and outcomes, particularly among younger cohorts, thereby affecting the qualitative profile of entrepreneurship within an economy (Staniewski & Szopiński, 2013).

Despite the growing body of literature addressing energy transition, human resource management, institutional quality and entrepreneurship, these domains are predominantly analysed in isolation. As a result, existing research provides fragmented insights that fail to explain why similar policy interventions produce divergent outcomes across countries and regions. This article addresses this gap by proposing an integrated analytical framework that conceptualises sustainable entrepreneurship as the outcome of dynamic interactions between energy transition pathways, human resource innovativeness and institutional quality in developing and emerging economies.

The central research objective of this study is to examine how these three dimensions jointly shape the conditions for sustainable entrepreneurial activity. By synthesising insights from energy economics, management theory and institutional analysis, the article advances a systemic perspective on development that transcends disciplinary silos and offers a more coherent explanation of sustainable growth under conditions of structural constraint.

Literature Review

In the classical literature on economic growth, energy has long been treated as an auxiliary input, subordinate to capital and labour. Such an approach has proven increasingly inadequate in explaining development trajectories in contemporary economies, particularly in regions characterised by structural dependence on energy-intensive industries. Empirical research demonstrates that in developing and emerging economies economic growth remains strongly correlated with high levels of energy consumption, reinforcing patterns of environmental degradation and external vulnerability. Recent contributions challenge this deterministic view by demonstrating that the structure of energy consumption, rather than its absolute volume, plays a decisive role in shaping long-term development outcomes (Bekun et al., 2025).

The concept of transition pathways introduces a systemic understanding of energy transformation, emphasising the interaction between technological change, market openness and institutional frameworks. Renewable energy adoption alters production functions, reduces exposure to external shocks and reshapes investment incentives. However, the effectiveness of these mechanisms is contingent upon complementary conditions, including market integration and regulatory predictability. Open market conditions facilitate access to clean technologies and capital flows, while protectionist or fragmented markets tend to reinforce carbon-intensive growth models (Bekun et al., 2025).

Importantly, energy transition should not be conceptualised as a linear process of substitution. Rather, it constitutes a structural transformation that permeates organisational routines, labour markets and entrepreneurial strategies. This perspective shifts analytical attention from energy supply alone to the broader socio-economic system in which energy is produced, distributed and utilised.

Within management theory, innovativeness has progressively replaced efficiency as the central criterion of organisational performance in environments characterised by uncertainty and rapid change. Human resource management plays a critical role in this transformation, as it structures the cognitive and behavioural capacities of organisations. Innovativeness in human resources encompasses not only formal training systems and incentive mechanisms but also organisational cultures that promote learning, experimentation and knowledge sharing.

Staniewski (2011) conceptualises human resource innovativeness as a systemic organisational attribute, rooted in the alignment between individual competencies and collective goals. From this perspective, innovation emerges not as a

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discrete outcome but as a continuous process of adaptation mediated by human agency. Such an approach is particularly relevant in the context of energy transition, where organisations must integrate new technologies while simultaneously redefining skill requirements and work practices.

Empirical studies indicate that firms with innovative human resource systems exhibit higher absorptive capacity, enabling them to internalise external knowledge and translate it into productive outcomes. Conversely, rigid human resource structures constrain organisational learning and amplify the costs of technological change. Human resource innovativeness thus functions as a critical transmission mechanism between macro-level structural change and micro-level organisational performance (Staniewski, 2011).

Institutional quality constitutes a foundational determinant of economic behaviour, shaping incentive structures, transaction costs and expectations regarding future outcomes. Weak institutions undermine development not only through inefficiency but also through normative erosion, as uncertainty and opportunism replace trust and long-term orientation. Corruption, in particular, represents a systemic distortion that affects both public and private economic activity.

Empirical evidence from developing economies demonstrates that corruption significantly reduces domestic savings, thereby constraining the availability of internal financial resources for investment and innovation (Abu & Staniewski, 2022). This effect extends beyond direct financial losses, as corruption increases risk premiums, shortens investment horizons and discourages formal economic activity. In such contexts, entrepreneurial initiatives face structural barriers unrelated to individual capability or technological feasibility.

The erosion of domestic savings has broader macroeconomic implications. It limits the capacity of economies to finance energy transition and organisational innovation from endogenous sources, increasing dependence on volatile external capital flows. Institutional quality thus emerges as a critical conditioning factor that shapes the effectiveness of both energy and human capital policies (Abu & Staniewski, 2022).

Entrepreneurship research increasingly recognises that entrepreneurial activity is embedded within social and institutional contexts. Socioeconomic factors such as education, income expectations and family background influence not only the likelihood of entrepreneurial entry but also the qualitative orientation of entrepreneurial behaviour. Empirical studies on student entrepreneurship demonstrate that socioeconomic conditions significantly shape attitudes toward risk, innovation and long-term planning (Staniewski & Szopiński, 2013).

These findings challenge reductionist views of entrepreneurship as a purely individual trait. Instead, entrepreneurship emerges as a socially conditioned process, in which individual agency interacts with structural constraints and opportunities. In the context of sustainable development, this interaction becomes particularly salient, as sustainable entrepreneurship requires long-term orientation, tolerance for uncertainty and alignment with broader societal goals.

Taken together, the literature suggests that energy transition, human resource innovativeness, institutional quality and entrepreneurship form an interconnected system. However, existing studies rarely integrate these dimensions into a coherent analytical framework, leaving significant explanatory gaps regarding sustainable development trajectories in developing and emerging economies.

Conceptual Framework and Analytical Assumptions

The conceptual framework developed in this study is grounded in a systemic approach to economic development, according to which sustainable entrepreneurship emerges as the result of interdependent structural, organisational, and institutional processes. This perspective rejects analytical fragmentation and assumes that economic outcomes observed in developing and emerging economies cannot be adequately explained by isolated variables such as energy supply, human capital, or institutional quality considered independently. Instead, sustainable entrepreneurship is conceptualised as an emergent phenomenon arising from the dynamic coherence of multiple layers of the socio-economic system.

At the structural level, energy transition constitutes a fundamental condition shaping the long-term configuration of economic activity. In developing and emerging economies, historical growth patterns have been closely associated with energy-intensive and carbon-dependent production structures. Such configurations have generated not only environmental externalities but also macroeconomic vulnerabilities related to price volatility and external dependence. Recent empirical research demonstrates that the diffusion of renewable energy technologies, particularly under conditions of market openness, can significantly modify these growth trajectories by altering production costs, investment incentives, and technological opportunities (Bekun et al., 2025). Energy transition is therefore treated here as a structural transformation that redefines the feasible space of economic action rather than as a narrow process of technological substitution.

However, structural transformation alone does not guarantee sustainable economic outcomes. Its effectiveness is mediated by organisational capacities that determine whether new technological and market conditions can be internalised within firms. At the organisational level, human resource innovativeness represents a key adaptive mechanism through which structural change is translated into productive economic behaviour. Innovativeness in human resource management encompasses learning processes, skill development, knowledge integration, and the alignment of individual competencies with evolving organisational objectives. As demonstrated by Staniewski (2011), innovative human resource systems enhance organisational flexibility

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and absorptive capacity, enabling firms to respond effectively to technological change and environmental uncertainty.

In the context of energy transition, human resource innovativeness plays a mediating role between macro-level transformation and micro-level performance. Organisations lacking innovative human resource practices are likely to experience skill mismatches, resistance to change, and technological inertia, even when favourable structural conditions exist. Conversely, firms characterised by learning-oriented human resource architectures are better positioned to integrate renewable energy technologies and adapt their business models accordingly (Staniewski, 2011).

The institutional layer of the framework captures the normative and regulatory environment within which both structural transformation and organisational adaptation occur. Institutional quality shapes expectations regarding rule enforcement, contract stability, and the credibility of long-term commitments. Empirical evidence indicates that corruption constitutes a significant systemic constraint in many developing economies, exerting a negative effect on domestic savings and thereby limiting the availability of internal financial resources for investment and innovation (Abu & Staniewski, 2022). Weak institutional environments increase uncertainty, shorten planning horizons, and undermine trust, reducing the effectiveness of both energy transition policies and organisational innovation efforts.

Within this multi-layered system, entrepreneurship functions as an integrative mechanism that connects structural opportunities, organisational capabilities, and institutional conditions. Entrepreneurial activity translates systemic conditions into concrete economic action, while simultaneously reflecting the degree of alignment—or misalignment—between these dimensions. Entrepreneurs operate at the intersection of energy systems, organisational resources, and institutional frameworks, making entrepreneurship a critical locus where systemic coherence becomes empirically observable.

Entrepreneurial agency itself is socially and economically conditioned. Socioeconomic factors such as education, income expectations, and social capital influence both the propensity to engage in entrepreneurial activity and its strategic orientation. Empirical research demonstrates that socioeconomic background significantly affects entrepreneurial intentions, risk tolerance, and long-term planning, particularly among younger cohorts (Staniewski & Szopiński, 2013). These determinants link individual-level agency with organisational and institutional contexts, reinforcing the systemic character of entrepreneurial outcomes.

A core analytical assumption of the proposed framework is the rejection of linear causality. The relationships between energy transition, human resource innovativeness, institutional quality, and entrepreneurship are conceptualised as recursive and mutually reinforcing. Energy transition reshapes organisational requirements and competitive pressures; organisational adaptation influences entrepreneurial behaviour; and institutional quality conditions the effectiveness of both processes by shaping expectations and access to financial resources (Bekun et al., 2025; Staniewski, 2011; Abu & Staniewski, 2022).

Sustainable entrepreneurship therefore emerges not from isolated interventions or single-factor optimisation, but from systemic coherence across structural, organisational, and institutional dimensions. Where such coherence exists, entrepreneurial activity is more likely to contribute to long-term value creation, environmental sustainability, and economic resilience. Where it is absent, entrepreneurial efforts remain fragmented, short-term oriented, or environmentally neutral. The conceptual framework thus provides a rigorous basis for analysing sustainable development as a systemic process rather than as a collection of disconnected economic outcomes.

Discussion

The analytical framework developed in this study allows for a reinterpretation of divergent development trajectories observed across developing and emerging economies by moving beyond sectoral or linear explanations of growth. Rather than attributing success or failure to isolated factors—such as energy availability, managerial competence, or institutional reform—the framework highlights the systemic conditions under which sustainable entrepreneurship can emerge as a durable component of economic development.

From the perspective of energy economics, the findings support the argument that energy transition has the potential to decouple economic growth from energy intensity, but only under specific structural and institutional conditions. Empirical evidence indicates that the diffusion of renewable energy technologies, particularly when accompanied by open market conditions, alters investment incentives and reduces long-term vulnerability to external shocks (Bekun et al., 2025). However, the discussion suggests that energy transition should not be interpreted as a self-sufficient driver of sustainable growth. In economies characterised by weak organisational capabilities or institutional fragility, renewable energy deployment may remain confined to isolated projects without generating broader entrepreneurial or developmental spillovers.

At the organisational level, the discussion reinforces the central role of human resource innovativeness as a mediating mechanism between structural transformation and economic performance. Energy transition introduces new technological requirements, skill demands, and organisational routines, which cannot be effectively internalised without adaptive and learning-oriented human resource systems. As demonstrated by Staniewski (2011), innovativeness in human resource management enhances organisational absorptive capacity, enabling firms to translate external technological change into internal knowledge and competitive advantage. The discussion thus confirms that organisational inertia, rather than technological scarcity, often constitutes the primary bottleneck in transition processes.

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Importantly, the effectiveness of both energy transition and organisational adaptation is strongly conditioned by institutional quality. The analysis underscores that corruption and weak governance structures undermine sustainable development not only through inefficiency, but through their corrosive effects on financial foundations and long-term orientation. Empirical findings showing the negative impact of corruption on domestic savings illustrate how institutional weakness constrains the availability of endogenous capital necessary for investment in innovation and sustainable entrepreneurship (Abu & Staniewski, 2022). In such environments, firms and entrepreneurs are incentivised to prioritise short-term survival strategies over long-term value creation, limiting the transformative potential of both energy and organisational reforms.

Entrepreneurship emerges in this discussion as a critical integrative mechanism through which structural, organisational, and institutional conditions are translated into economic outcomes. However, entrepreneurial activity is shown to be highly sensitive to socioeconomic determinants that shape individual agency and strategic orientation. Empirical evidence indicates that socioeconomic background significantly influences entrepreneurial intentions, risk tolerance, and planning horizons, particularly among younger cohorts entering the labour market (Staniewski & Szopiński, 2013). Where education, social capital, and institutional trust are weak, entrepreneurship tends to assume necessity-driven and low-innovation forms, even in the presence of favourable structural conditions.

The discussion therefore challenges policy approaches that promote entrepreneurship as a universal remedy for development challenges without addressing underlying systemic constraints. Energy policies that focus exclusively on technological deployment risk technological underutilisation when organisational and human capital dimensions are neglected. Similarly, innovation and entrepreneurship policies implemented in corrupt or institutionally unstable environments face structural barriers that cannot be overcome through managerial intervention alone (Abu & Staniewski, 2022; Staniewski, 2011).

A key contribution of this discussion lies in its emphasis on recursive causality. Energy transition reshapes organisational requirements and entrepreneurial opportunities; organisational adaptation influences the capacity to exploit these opportunities; and institutional quality conditions the credibility and sustainability of both processes. Empirical evidence supports the view that where these dimensions reinforce one another, energy transition can stimulate opportunity-driven entrepreneurship and long-term investment (Bekun et al., 2025). Conversely, where misalignment persists, development trajectories remain fragmented and vulnerable.

From a theoretical standpoint, the discussion supports a shift toward systemic models of sustainable development that integrate insights from energy economics, management theory, and institutional analysis. It suggests that sustainable entrepreneurship should be conceptualised not as an individual trait or isolated outcome, but as a systemic phenomenon emerging from the alignment of structural incentives, organisational capabilities, and institutional trust. Such a perspective offers a more robust explanation of why similar policy interventions yield divergent outcomes across countries and regions.

Conclusions

This article set out to address a central limitation of contemporary research on sustainable development in developing and emerging economies, namely the persistent fragmentation of analytical perspectives across energy economics, management studies, institutional analysis, and entrepreneurship research. By advancing a systemic framework that integrates energy transition, human resource innovativeness, and institutional quality, the study demonstrates that sustainable entrepreneurship cannot be adequately explained as the outcome of isolated technological, managerial, or policy interventions.

The analysis confirms that energy transition constitutes a necessary but insufficient condition for sustainable development. While the diffusion of renewable energy technologies can alter growth trajectories and reduce long-term vulnerability, its developmental impact remains contingent upon organisational and institutional contexts. Energy transition, when treated as a purely technological process, risks producing limited or uneven effects that fail to translate into durable entrepreneurial and economic transformation.

A central conclusion of the study is that human resource innovativeness plays a decisive mediating role in this process. Organisational capacity to learn, adapt, and internalise technological change determines whether structural transformation can be converted into productive economic activity. Firms and economies lacking innovative human resource architectures are structurally constrained in their ability to exploit new energy regimes, regardless of technological availability. Organisational inertia thus emerges as a critical barrier to sustainable entrepreneurship.

Equally important is the role of institutional quality as a conditioning factor shaping long-term orientation and financial viability. Weak institutions undermine sustainable development not only by increasing transaction costs, but by eroding trust, discouraging savings, and shortening investment horizons. In such environments, entrepreneurial activity is systematically biased toward short-term, low-risk, and low-innovation strategies, limiting its contribution to sustainability and structural transformation.

The study further demonstrates that entrepreneurship should be understood as an integrative mechanism rather than an autonomous driver of development. Entrepreneurial outcomes reflect the degree of alignment between structural incentives, organisational capabilities, and institutional conditions. Socioeconomic determinants shape entrepreneurial agency, but their effects are amplified or neutralised by the broader

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systemic environment. Sustainable entrepreneurship therefore emerges only where systemic coherence exists across these dimensions.

From a theoretical perspective, the findings support a shift away from linear and single-factor models of development toward recursive and system-oriented explanations. Sustainable entrepreneurship is best conceptualised as an emergent property of aligned energy systems, adaptive organisations, and credible institutions. This perspective provides a more robust explanation of why similar development strategies yield divergent outcomes across countries and regions.

The policy implications of this study are clear. Strategies focused exclusively on energy investment, entrepreneurship promotion, or managerial reform are unlikely to succeed in isolation. Effective sustainable development policies must be coordinated across energy systems, human capital development, and institutional reform. Without such coordination, policy interventions risk reinforcing fragmentation rather than generating transformation.

In conclusion, sustainable entrepreneurship in developing and emerging economies should be understood not as an isolated economic phenomenon, but as a systemic outcome of coherent structural, organisational, and institutional change. Only under conditions of such coherence can energy transition serve as a foundation for resilient, inclusive, and long-term economic development.

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