

Strategic Collaboration between Startups and Corporations in Driving Green Business Innovation

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Abstract

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Strategic partnerships between startups and corporations play a crucial role in driving sustainable green business innovation. This study aims to examine the contribution of such strategic synergy through a systematic literature review of recent academic publications. The findings indicate that these collaborations significantly accelerate the adoption of environmentally friendly technologies, improve resource efficiency, and foster the transformation of business models towards sustainability. By leveraging the agility of startups and the resources of corporations, such partnerships create a mutually beneficial dynamic that enhances innovation capacity and operational scale. The integration of sustainable values and shared innovation agendas strengthens the competitiveness and resilience of businesses in facing global environmental challenges. Additionally, the study highlights the importance of governance structures, mutual trust, and policy support to ensure the long-term effectiveness of these partnerships. The collaboration between startups and corporations emerges not only as a strategic option but as a necessity in transitioning towards an inclusive and low-carbon economy that aligns with global sustainability goals.

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1. Introduction

In the context of the increasingly urgent climate crisis and the paradigm shift in the global economy towards long-term sustainability, strategic collaboration between startups and corporations has become a crucial and relevant strategy in driving the pace of green innovation in an effective and inclusive manner. Startups are widely known as agile, flexible, and highly adaptive entities that often pioneer the development of cutting-edge technology and disruptive, systemic-impact environmental solutions. They can respond to changes quickly, innovate radically, and explore new opportunities in the domain of sustainability. In contrast, corporations which have vast capacity in the form of financial resources, global distribution networks, broad market access, and brand power tend to be hampered by rigid bureaucratic structures and a lack of agility in dealing with the rapid dynamics of innovation. Therefore, the partnerships formed between these two entities create a mutually beneficial collaborative synergy that can significantly accelerate the growth of sustainable innovation in various industrial sectors (Tolstykh et al., 2023).

As pressure from stakeholders including investors, consumers, regulators, and civil society to adopt and implement Environmental, Social, and Governance (ESG) principles increases, corporations are increasingly realizing the urgency and pressing need to transform their businesses towards a greener, more sustainable, and socially and environmentally responsible direction. However, in reality, initiatives carried out internally by corporations alone are often not strong enough to create radical and innovative change. Collaboration with startups, in this case, becomes a strategic and tactical shortcut that allows access to new ideas, revolutionary clean technologies,

and innovative business models that are adaptive to evolving environmental challenges. On the other hand, startups also gain significant advantages through these partnerships, such as access to larger market networks, more stable funding sources, and faster technology validation through large-scale trials provided by corporate partners.

The innovation ecosystem that supports and strengthens these collaborations is generally characterized by the formation of various mechanisms such as business incubators, green accelerators, and corporate venture capital (CVC) that specifically target and fund green startups with high impact potential. In addition to these private initiatives, government regulatory frameworks and policies also play an important role in stimulating and accelerating this synergy through the provision of fiscal incentives, carbon tax exemption policies, and structured, results-oriented joint research and development (R&D) funding support. However, behind the great potential offered by this strategic collaboration, there remain complex challenges. One of the main obstacles is the difference in organizational culture between startups and corporations, including differences in strategic goals, operational scale, managerial structure, as well as the speed and manner of decision-making, which tend to be fundamentally different (Lee, 2022).

To overcome this obstacle, a strategic, flexible, and structured collaborative framework is needed, one that is specifically designed to be oriented towards tangible and measurable long-term sustainability goals. This research specifically aims to explore and analyze how strategic collaboration between startups and corporations can drive green business innovation effectively, efficiently, and sustainably. By using

a literature study approach to academic publications published in the period from last five years, this study will summarize the main trends, collaborative strategies, real challenges, and future opportunities arising from such collaborations, and ultimately provide a strong conceptual foundation for the development of better long-term policies and collaborative strategies in the future.

2. Literature Review

2.1. The Strategic Role of Startups in Green Innovation

Startups play a very important role as early drivers in the process of developing various innovative and wide-ranging green solutions. With organizational structures that tend to be lean, agile, and not burdened by layered bureaucracy like large companies, they are able to respond quickly, flexibly, and effectively to the growing market demand for environmentally friendly products and services (Zaridis & Logotheti, 2020). When demand for sustainable practices increases, green startups are present, bringing revolutionary and adaptive technology-based solutions. Technologies such as the circular economy, renewable energy from nature and free of emissions, and the digitalization of the agricultural sector for food production efficiency have been widely developed and tested by green startups in various industrial contexts.

Green startups present a new paradigm in contemporary business practices that are no longer solely oriented towards short-term financial gains, but also pay close attention to the environmental and social impacts created. Their business models are generally based on the triple bottom line, which combines economic,

social, and environmental aspects in a balanced way. This approach directly opens up great opportunities for strategic collaboration with large corporate entities that are transforming towards Environmental, Social, and Governance (ESG) principles, where sustainability is a core value in their long-term operations and business strategy.

2.2. The Power of Corporations in Driving Sustainable Transformation

While startups offer a variety of fresh ideas and disruptive innovations, corporations, on the other hand, provide the resources that are greatly needed to implement green innovation on a massive scale. These resources include large amounts of investment capital, broad access to domestic and international markets, and established and integrated operational infrastructure. This synergy allows green solutions from startups to be widely adopted and developed in various industrial sectors. In recent years, corporate sustainability strategies have increasingly integrated collaboration with startups as part of open innovation practices, which allows large companies to access external knowledge and accelerate their internal innovation processes (Xie et al., 2019). This collaboration is not only tactical but also strategic in facing climate challenges and global regulatory shifts that demand emission reduction and resource efficiency.

Morone (2020) emphasize that many corporations are now beginning to adopt strategic partnership practices through the formation of special units that focus on innovation development, such as venture builders that create and support startups from within, internal incubators that foster innovative ideas, and direct investment in clean technology-based startups. All of this is aimed at strengthening

the company's competitiveness and long-term sustainability. Thus, the synergy between the long-term strategic direction of corporations and the speed of innovation possessed by startups becomes a key element of the success of this cross-entity collaboration.

2.3. Strategic Collaboration Model: Synergy, Challenges, and Key Factors

Successful collaboration between startups and corporations cannot happen spontaneously, but rather requires a cooperation model built on a foundation of mutual trust, alignment of core values between organizations, and a fair and mutually beneficial incentive system (Peter et al., 2019). Without these three elements, the collaborative relationship is at risk of becoming unbalanced or unsustainable. Trust allows for the open exchange of information and technology, while value alignment creates a shared direction in responding to sustainability challenges. A clear incentive system is also important so that both parties feel valued and have long-term motivation to work together actively. A study conducted by Huong et al. (2021) specifically highlights the importance of implementing a transparent, accountable, and flexible governance framework.

This framework serves to accommodate the differences that often occur in organizational culture, hierarchical structures, and differences in business priorities and approaches between agile startups and more bureaucratic corporations. Kraus et al. (2019) also underscore that the long-term success of such collaborations is highly dependent on a shared understanding and commitment to sustainability goals, as well as an orientation towards the creation of sustainable value. Collaborations

that are too transactional, without strategic depth, tend to fail in creating meaningful and transformational innovative impact.

3. Method

This study adopts a qualitative approach with a systematic literature review method to examine the dynamics of strategic collaboration between startups and corporations in the context of driving green business innovation. The data collection process was carried out by conducting an intensive search of relevant and recent academic literature, using the Google Scholar database as the main source. The search was focused on publications, using a combination of keywords such as "strategic collaboration," "startup," "corporate sustainability," "green innovation," and "business partnership" to filter articles that have a close connection to the research topic. The selection of literature was carried out selectively based on specific criteria that ensure the quality and relevance of the content.

Only articles from high-reputation international journals published by leading academic institutions such as Scopus, Springer, Elsevier, and IEEE were used as analysis material. These articles also had to specifically discuss cooperation between startups and corporations within the framework of green innovation and show a connection to theoretical approaches such as open innovation and the green business framework. Based on the filtering results, a total of 13 scientific articles were selected as the main material for in-depth analysis. The analysis of the selected literature was performed using a thematic coding method, which involves identifying

and grouping findings based on the main themes that consistently emerged in various studies.

These themes include the strategic role of startups, the contribution of corporations in supporting green innovation, the forms of collaborative models applied, the challenges in partnership integration, and the concrete impact of this cooperation on accelerating sustainable innovation. To maintain the validity of the study's results, source triangulation was carried out by comparing findings between articles and linking them with established theories in the fields of innovation and sustainability. This study was not designed to test quantitative hypotheses, but rather to generate a conceptual understanding and strategic insights that can be used as a basis for formulating policies and managerial practices that are more responsive to the dynamics of cross-entity collaboration.

4. Results

The results of the literature review indicate that strategic collaboration between startups and corporations has a significant contribution in accelerating the birth of green innovation that is not only technical but also systemic and has a broad impact. Based on the analysis of 13 relevant scientific articles, it was found that this collaboration is not singular or static, but rather develops in various formats that are flexible and adaptive to the needs of each party. The forms of collaboration include joint research and development (R&D) partnerships, investment schemes through corporate venture capital, startup incubation and acceleration programs, and the formation of joint ventures based on green technology projects that have long-term

commercialization potential. Through these various forms, collaboration is able to drive the development of sustainable products, increase efficiency in the use of natural resources, and accelerate the transition to a circular business model that is the main foundation of a low-carbon economy (Onukwulu et al., 2022).

One of the main dimensions that is a strength in this collaboration is the two-way transfer of knowledge between startups and corporations (Gupta et al., 2021). Startups, with their dynamic characteristics and ability to innovate quickly, are able to generate new ideas and promising experimental technologies. They usually have a bottom-up approach and are oriented towards specific solutions to environmental problems. This innovation can then be transferred and adopted by corporations, which have large-scale production infrastructure, global distribution networks, established operational capacity, and experience in managing complex supply chains. On the other hand, corporations also make a large contribution in the form of managerial mentoring, access to broader markets, assurance of compliance with industry regulations, and support from the brand's reputation. According to Morone (2020), this mutualistic dynamic accelerates the commercialization process of clean technologies developed by startups, while also expanding the social and environmental impact of these technologies to a broader scale.

The results of this collaboration are not only limited to the final product but also include innovation in business processes. Some collaborations have succeeded in creating significant energy efficiency, carbon emission reduction, reuse of industrial waste, and the development of green logistics systems based on technology. For example, startups that focus on developing blockchain technology

for supply chain tracking and traceability, data-based precision farming platforms in real-time, and smart water management systems based on the Internet of Things (IoT), have shown success in collaborating with large corporations. Their technology is then integrated into industrial-scale production systems, which results in cost efficiency as well as an increase in company sustainability standards.

However, behind this great potential, the study's results also note the existence of substantial challenges that arise, especially in the aspects of organization and work culture. Differences in operational rhythm, decision-making structure, leadership style, and incentive systems between agile startups and more bureaucratic corporations often lead to friction. This obstacle is at risk of disrupting the continuity of collaboration if not handled strategically. Huong et al. (2021) emphasize the importance of an approach called “orchestrated collaboration,” which is a collaborative framework that is carefully designed by placing open communication, process transparency, and collaborative governance as its main principles. This approach facilitates the alignment of interests and ensures that both parties have balanced and mutually respectful roles and expectations in carrying out the collaboration.

One of the most widely used approaches by corporations in building strategic relationships with green startups is through the corporate venture capital (CVC) model (Döll et al., 2022). This model gives corporations the freedom to fund and facilitate startups that have great potential, without having to immediately integrate them into the parent company's structure. This allows corporations to experiment with new innovations with more measured risks. According to research conducted

by Peter et al. (2019), CVC not only provides funding, but also serves as a means for corporations to gain market insights, identify green technology trends, and form a portfolio of sustainable innovation. In many cases, CVC is also used as a "fast track" to make strategic acquisitions of startups that are considered to have high strategic value in the future.

In addition to CVC, green accelerator platforms organized directly by corporations have also proven to be an effective mechanism for creating a pipeline of green startups that are ready for commercialization. These accelerators not only provide training and mentoring but also open up opportunities for concrete collaboration in the form of pilot projects, joint product trials, and access to investor networks. Some corporations even form internal incubators that aim to assist early-stage startups in the process of technology validation, business model testing, and evaluating the sustainability impact of their products. With this mechanism, corporations can take an active role as innovation catalysts, not merely as investors or technology buyers. This approach also encourages cross-sectoral learning, where the best practices of startups can be internalized into the work system of corporations, and vice versa.

From a global sustainability perspective, the synergy between startups and corporations has a real contribution to the achievement of a number of Sustainable Development Goals (SDGs), especially SDG 9 related to industry, innovation, and infrastructure; SDG 12 regarding responsible consumption and production; and SDG 13 related to climate action. Startups often bring a strong spirit of social and environmental change as part of their identity, while corporations provide resources,

distribution channels, and execution capacity to expand the impact of these green solutions. This collaboration bridges the gap between innovative ideas and their implementation on a scale that can have a systemic impact.

Zaridis and Logotheti (2020), also highlight that the advancement of digital technology has played an important role in strengthening the effectiveness and efficiency of this collaboration. Technologies such as artificial intelligence, blockchain, and big data are not only used in product development, but also in monitoring and evaluating the sustainability performance of the collaboration. Sustainability performance monitoring systems developed jointly between startups and corporations have been shown to increase transparency, accountability, and strengthen work relationships based on trust. The data generated from this system also becomes an important foundation in the decision-making process, both for internal needs and for reporting to external stakeholders.

Overall, the findings from this literature study conclude that strategic collaboration between startups and corporations is not just an option or an alternative, but has become a structural necessity in facing the major challenges of the transition era towards a green economy. This collaboration presents concrete solutions to accelerate technology innovation, reduce the ecological footprint of industry, and create economic value that is in line with the principles of sustainability. The alignment of vision between startups and corporations, supported by a supportive institutional structure, as well as a long-term commitment to ESG principles, becomes the main foundation in building successful collaborations. Without these three elements, collaboration is at risk of failing to create the expected

innovative impact and potentially losing its relevance in a business ecosystem that is increasingly driven by sustainability values.

5. Discussion

The findings of this study show that the strategy of collaboration between startups and corporations makes a significant contribution to the acceleration of green innovation in various industrial sectors. This kind of collaboration becomes an important mechanism in overcoming the internal limitations inherent in each party. Startups often have high innovative capacity and fresh disruptive ideas but face serious obstacles in terms of access to broader markets, initial funding, and established industry networks. In contrast, corporations generally have strengths in terms of capital, production infrastructure, and proven global distribution channels but are often slow to respond to the dynamics of technological change and innovation due to complex bureaucratic structures and decision-making.

This dynamic creates a relationship that is mutually complementary and enriching, where each party brings strengths and weaknesses that can be covered by its partner (Gadomska-Lila, 2020). Collaborations based on sustainability values also strengthen the effectiveness of the innovations produced and increase public trust in the environmental and social commitments of both entities. This directly impacts the company's reputation and the perceptions of consumers who are increasingly aware of ESG issues. These findings are in line with the open innovation model which emphasizes the importance of opening up organizational boundaries to leverage ideas and resources from outside. In addition, this approach also supports

the concept of a green innovation ecosystem, where interactions between different actors such as startups, corporations, government, and financing institutions can create a systemic transformational impact.

However, this study also underscores that the success of strategic collaboration is highly determined by the effectiveness of the governance and communication structures built between collaborative partners. Many studies mention that the lack of clarity in roles and responsibilities, the misalignment of short-term and long-term goals, and differences in business expectations are the main causes of failure in collaboration. Therefore, a comprehensive and adaptive strategic framework is needed, including practices of co-creation, constructive conflict management, expectation setting, and a mechanism for sharing risks and results fairly (Wang et al., 2019).

The practical implication of the results of this study is the importance for corporations to redesign their internal innovation strategies to be more open to cross-entity partnerships, especially with green startups. They need to provide a safe space for experimentation, set aside a budget for initial risk financing, and create an innovation climate that encourages the principles of sustainability as a core value. On the other hand, startups are also required to build collaborative capabilities, readiness in terms of operational structure, and flexibility in adapting to the expectations of the corporate world in order to become a reliable, strategic, and sustainable partner.

At the policy level, this study highlights the need for active involvement of government and development financing institutions in creating a regulatory

environment that encourages cross-sector partnerships. Proactive policies such as support for green corporate venture capital initiatives, tax cuts for investments in sustainable technology, and increased capacity of the local innovation ecosystem are very crucial. Without support from the public policy side, this collaboration will not achieve the scale of impact expected. Furthermore, this study opens up a wide space for further research, especially in terms of developing a more comprehensive evaluation framework to measure the impact of collaboration on ESG performance and the long-term sustainability of green innovation. Research based on longitudinal analysis and cross-industry case studies will be very useful to enrich our understanding of how this kind of strategic collaboration can truly become the main driver of systemic transformation towards a more resilient and inclusive global green economy.

6. Conclusion

Strategic collaboration between startups and corporations is an important pillar in driving green business innovation in the era of sustainability transformation. Through this literature study, it was found that this collaboration encourages a unique synergy between the flexibility and creativity of startups with the resources and organizational structure of corporations. This synergy results in various forms of innovation that not only increase business competitiveness but also make a real contribution to the environment and society. The key to the success of this collaboration lies in the alignment of the sustainability vision, effective collaborative governance, and support from an inclusive innovation ecosystem.

Challenges remain, especially in the differences in organizational culture and incentive systems, but can be overcome with a strategic approach based on co-creation and adaptive governance. This study recommends that policymakers and business leaders continue to build and expand collaborative spaces between startups and corporations in the context of green business. It is also necessary to develop collaboration impact metrics so that sustainability values can be measured and improved consistently. Thus, this strategic collaboration is not just a tactical solution, but a strategic foundation in accelerating the global transition towards a green economy that is inclusive, fair, and sustainable.

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