THE ROLE OF ENVIRONMENTALLY ORIENTED START-UPS IN THE TRANSFORMATION OF TRADITIONAL SECTORS OF THE ECONOMY

Maria Dobrynina[1], Tatiana Rastimeshina[2], Alexandra Andreeva[1], Madina Akoeva[3]

•

[1]National Research University of Electronic Technology, RUSSIA
[2]Russian State Social University, RUSSIA
[3]North Ossetian State University named after K.L. Khetagurov, RUSSIA
mic.org.miet@gmail.com

Abstract

This paper delves into the significant role that environmentally oriented start-ups play in transforming traditional sectors of the economy. As the world grapples with pressing environmental challenges such as climate change, resource depletion, and biodiversity loss, these innovative enterprises are emerging as vital agents of change. The study investigates how these start-ups disrupt conventional business models by implementing sustainable practices, enhancing resource efficiency, and promoting the principles of the circular economy. By harnessing cutting-edge technologies and innovative approaches, environmentally focused start-ups contribute to a range of economic activities that prioritize sustainability. They challenge traditional industry norms by offering greener alternatives, optimizing supply chains, and minimizing waste. This paper also explores case studies that exemplify the successful integration of sustainable practices into sectors such as agriculture, manufacturing, and energy, showcasing how these start-ups not only address environmental issues but also create economic opportunities and stimulate job growth. Furthermore, the findings emphasize the importance of supportive policies, regulatory frameworks, and collaborative ecosystems in nurturing the growth of these start-ups. The paper advocates for the establishment of partnerships between governments, established businesses, and start-ups to create an environment conducive to innovation and sustainability. By fostering collaboration, these stakeholders can ensure that environmentally oriented start-ups are equipped to make a meaningful contribution to the transition towards a green economy.

Keywords: environmentally oriented startups, transformation of traditional sectors, sustainable development, circular economy, innovation, sustainable practices

I. Introduction

The transformation of traditional sectors through the emergence of environmentally oriented startups marks a significant shift in the global economic landscape (fig.1). With growing awareness of climate change, resource depletion, and environmental degradation, these startups are stepping in to challenge established norms and drive innovation toward sustainability. They often operate at the intersection of technology, sustainability, and business, offering novel solutions that traditional industries can adopt to reduce their ecological footprints.

Role in Traditional Sectors.

In sectors such as agriculture, manufacturing, and energy, environmentally oriented startups are innovating processes and products that minimize environmental harm. For instance, in agriculture, these startups are developing precision farming techniques that optimize resource use and reduce chemical inputs, promoting sustainable food production. In manufacturing, companies

are adopting circular economy principles, where waste is minimized, and materials are reused or recycled, significantly lowering production costs and environmental impact.

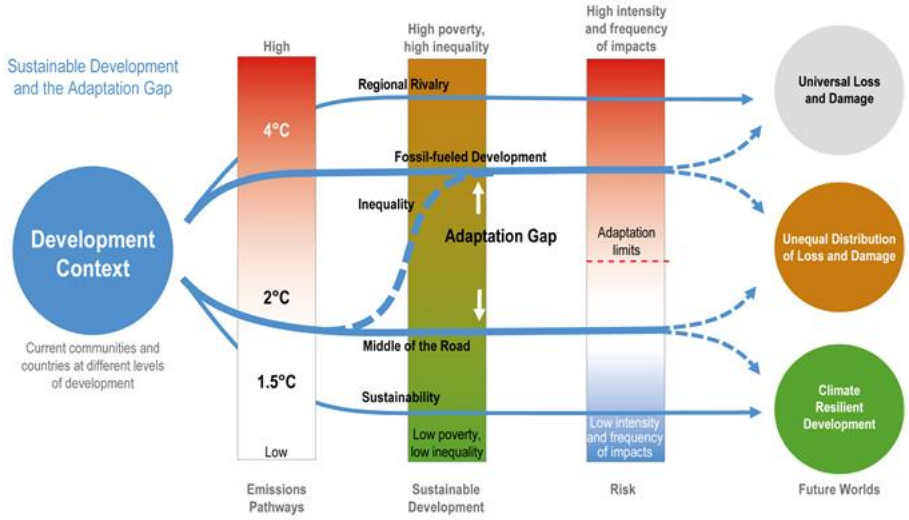

Figure 1: *Sustainable Development and the adaption gap*

In the energy sector, startups are spearheading the development of renewable energy technologies, such as solar, wind, and bioenergy. By providing affordable and accessible alternatives to fossil fuels, these startups not only reduce greenhouse gas emissions but also empower local communities and stimulate economic growth through job creation in green technologies.

Innovation and Collaboration.

Collaboration is another vital aspect of the role played by environmentally oriented startups. By partnering with traditional companies, these startups facilitate knowledge transfer and innovation diffusion. Established businesses often benefit from the agility and creativity of startups, allowing them to adopt sustainable practices more rapidly. This partnership can take many forms, including joint ventures, research collaborations, and supply chain integration, which ultimately foster a culture of sustainability within traditional sectors.

Moreover, startups often emphasize a stakeholder-centric approach, recognizing that environmental and social responsibilities go hand in hand. By engaging consumers and local communities in their initiatives, these businesses create a sense of ownership and accountability, driving broader societal change toward sustainability.

Policy and Regulatory Frameworks.

The role of government policy and regulatory frameworks cannot be understated in this transformation. Supportive policies, such as incentives for green innovation, subsidies for renewable energy, and stringent environmental regulations, create an enabling environment for environmentally oriented startups to thrive. Policymakers play a crucial role in fostering innovation ecosystems that facilitate startup growth by providing funding opportunities, incubators, and networks that connect startups with investors and industry leaders.

Furthermore, regulatory frameworks that encourage sustainable practices can significantly influence the behavior of traditional sectors. By mandating transparency in environmental reporting and promoting sustainability standards, governments can drive systemic change across industries, leading to a more sustainable economy.

Challenges and Future Directions.

Despite their potential, environmentally oriented startups face several challenges, including access to financing, market competition, and regulatory barriers. Many startups struggle to secure funding, particularly in the early stages, which can hinder their growth and scalability.

Additionally, competition from established companies with significant resources and market power can make it difficult for startups to penetrate traditional markets.

To overcome these challenges, it is essential to create a robust support system for environmentally oriented startups that includes financial backing, mentorship, and networking opportunities. Encouraging public-private partnerships can also help facilitate innovation and accelerate the adoption of sustainable practices in traditional sectors.

II. Methods

In exploring the role of environmentally oriented startups in transforming traditional sectors of the economy, a comprehensive methodological approach is essential. This section outlines three key methods that will be employed in the study:

1. **Case Study Analysis**
   - Description: This method involves an in-depth examination of specific environmentally oriented startups that have successfully transformed traditional sectors. Case studies will provide detailed insights into the strategies, innovations, and impacts of these startups on their respective industries.
   - Implementation: Selected startups from various sectors (e.g., agriculture, energy, manufacturing) will be analyzed. Data will be collected through interviews with founders, employees, and stakeholders, as well as through document analysis (e.g., business reports, press releases).
   - Expected Outcome: This method aims to identify best practices, challenges faced, and lessons learned that can inform other startups and traditional businesses seeking to embrace sustainability.
2. **Surveys and Questionnaires**
   - Description: Surveys will be used to gather quantitative data from a broader range of environmentally oriented startups and traditional businesses. This method will help assess perceptions, strategies, and the impact of startups on traditional sectors.
   - Implementation: A structured questionnaire will be developed, covering areas such as sustainability practices, collaborations with startups, and perceived barriers to adopting green innovations. The survey will be distributed to a sample of businesses in relevant sectors to collect data.
   - Expected Outcome: This method will provide statistical insights into trends, challenges, and opportunities related to the integration of environmentally oriented startups into traditional sectors.
3. Interviews with Key Stakeholders
   - Description: Semi-structured interviews will be conducted with key stakeholders, including entrepreneurs, industry experts, policymakers, and representatives from traditional sectors. This qualitative method will yield rich, nuanced perspectives on the role of startups in promoting sustainability.
   - Implementation: Interview questions will focus on experiences, opinions on the impact of startups, and recommendations for enhancing collaboration between startups and traditional businesses. The interviews will be recorded, transcribed, and analyzed for common themes and insights.
   - Expected Outcome: This method aims to capture diverse viewpoints and deepen understanding of the systemic changes driven by environmentally oriented startups in traditional sectors.

III. Results

A start-up is typically defined as a temporary organization or institution focused on finding a

profitable, measurable, and scalable business model. The key differentiating factor is the high level of uncertainty faced by start-up ventures. As long as a product or service is entirely novel and untested, it remains uncertain how the market will respond. Generally, start-ups progress through two developmental phases: the experimental phase and the production phase. Currently, approximately 90 percent of start-ups worldwide fail to advance beyond the experimental stage. Global experience indicates that start-ups require support during this initial phase, often referred to as the "start-up ecosystem." This experimental phase typically lasts about five years, although some start-ups may experience longer or shorter durations, necessitating ongoing support from the ecosystem. Such ecosystems globally are characterized by clear legal and regulatory frameworks, diverse partnerships and collaborations, engagement from public and private stakeholders, and incentives that create a conducive environment for the establishment and growth of start-up ventures. The concept of an ecosystem in business, borrowed from ecology, was first defined by Start-ups play a crucial role in the development, growth, and long-term sustainability of economy, as they represent the future evolutionary path of the nation. Consequently, it is essential to encourage and support these ventures. Their significance is emphasized in Business and Investment Development Strategy 2021-2027, which outlines steps to promote innovation initiatives, allocate more funds for research and development, and create a more favorable environment for start-up growth.

IV. Discussion

The start-up revolution has been fueled by significant infusions of public and private capital, which provide the necessary resources for these ventures to scale quickly and transform their innovative ideas into reality. As start-ups expand, they garner attention from industry veterans, paving the way for collaborations that blend traditional expertise with fresh perspectives. Rather than competing for dominance, start-ups and established industries are increasingly discovering avenues for coexistence and collaboration. Start-ups bring new ideas and energy, while established players contribute industry knowledge and resources. This synergy fosters a harmonious ecosystem in which innovation can flourish, all while honoring the rich traditions of established practices.

This new developmental trajectory is made possible by substantial investments, which ultimately benefit the economy as a whole. In the last five years leading up to 2023, the European Union alone has invested over $300 billion to create a more favorable environment for start-up development. This massive injection of public funds is complemented by private investments, and these considerable financial resources have undeniably brought about economic benefits.

Innovative products and services introduced by start-ups significantly contribute to market growth and expand consumer choices. Start-ups are recognized as key drivers of innovation, which can lead to economic growth and diversification. According to Germany’s Federal Ministry for Economic Affairs and Climate Action, start-ups are critical to market growth and increasing competition through their introduction of new products and services (BMWK, 2017). By presenting ideas that challenge established industries, start-ups create new investment opportunities and facilitate industry development.

This cycle of innovation yields positive economic effects, including increased job opportunities and heightened competitiveness within various sectors. The emergence of new concepts and technologies from start-ups can invigorate markets, fostering healthy competition and improving consumer offerings. Through their inventive approaches, start-ups can profoundly influence economic expansion and prosperity, reshaping the landscape of future industries.

The market becomes more competitive with the entry of new players offering innovative products and services. Start-ups play a crucial role in driving economic dynamism through their creative strategies. By disrupting traditional market dynamics, they stimulate economic growth

and foster innovation. This competition compels established companies to enhance their offerings, leading to a diverse array of consumer choices and improved quality.

Consumers benefit from a broader selection of products and services, as well as competitive pricing options. The presence of start-ups creates a more competitive market environment, resulting in greater overall value and quality for consumers. The competition instigated by start-ups not only benefits consumers but also contributes to economic advancement by promoting innovation and revitalizing the market.

According to Henry et al. (2020), circular start-ups can be classified into five distinct archetypes:

1. Design-based: These start-ups focus on product designs that require less material during production.

2. Waste-based: These ventures utilize waste as an input material for new products.

3. Platform-based: These include consumer-to-consumer marketplaces that facilitate the sharing or selling of pre-owned products.

4. Service-based: These start-ups replace ownership with access, allowing consumers to utilize services without needing to own the product.

5. Nature-based: These ventures leverage natural ecosystems for production without causing harm.

These categories cut across various industries, and it is possible for start-ups to incorporate multiple archetypes within a single venture.

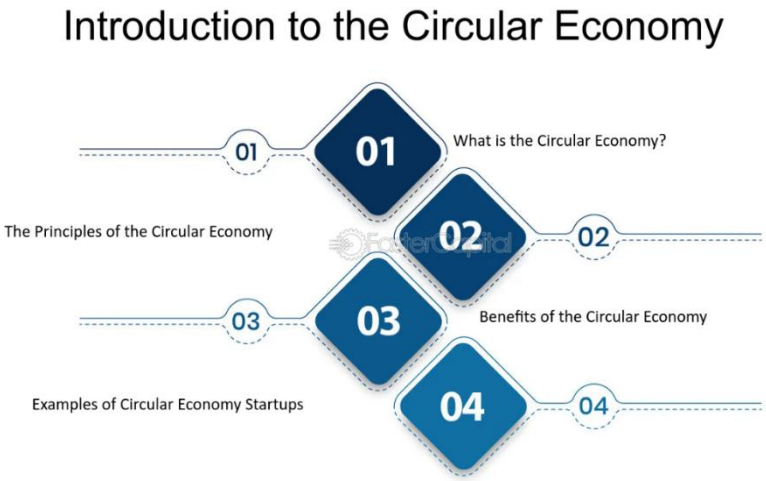

Figure 2: *Circular economy principles*

The idea of a circular economy is receiving considerable attention as a viable solution to the environmental issues we currently face. In contrast to the traditional linear economy, which operates on a "take, make, and dispose" model, the circular economy seeks to maximize the use of products and materials for as long as possible. This approach aims to minimize waste and enhance resource efficiency.

Principles of the Circular Economy.

To grasp the concept of the circular economy, it is crucial to understand its fundamental principles:

A. Eliminating Waste: The circular economy highlights the necessity of designing products and systems that reduce waste and pollution. This can be achieved by utilizing eco-friendly materials, adopting efficient manufacturing techniques, and creating products that are easy to repair, reuse, and recycle.

B. Keeping Products and Materials in Circulation: Rather than discarding items after their initial use, the circular economy promotes their refurbishment and reuse. By prolonging the lifespan of products, we can maximize their value and lessen the demand for new resources.

C. Restoring Natural Systems: The circular economy encourages the restoration and regeneration of natural resources. This encompasses sustainable practices like reforestation, water conservation, and the utilization of renewable energy sources.

Benefits of the Circular Economy.

Adopting the circular economy offers a variety of environmental and economic benefits, including:

A. Waste Minimization: By concentrating on waste prevention and recycling, the circular economy diminishes the volume of waste that ends up in landfills, thereby reducing environmental pollution and conserving natural resources.

B. Financial Savings: Implementing circular economy strategies can lead to significant cost reductions for businesses. For example, reusing materials and components can lower production expenses and decrease reliance on costly raw materials.

C. Job Creation: The circular economy has the potential to create new employment opportunities across various sectors, such as recycling, repair, and remanufacturing. This can foster economic growth and social advancement.

Examples of Circular Economy Startups

Many startups are emerging to facilitate the shift toward a circular economy. Here are a few noteworthy examples:

A. TerraCycle: This company specializes in recycling materials that are difficult to process. TerraCycle collaborates with major brands to collect and recycle items like cigarette butts, coffee capsules, and even chewing gum, transforming them into new products.

B. Grover: Grover offers a subscription-based rental service for electronics, allowing users to rent devices instead of buying new ones. This model promotes product reuse and helps reduce electronic waste.

C. ResQ Club: This app connects consumers with restaurants, cafes, and other food establishments to sell surplus food at discounted prices. By reducing food waste, ResQ Club supports the circular economy while providing affordable meals to customers.

In summary, the circular economy signifies a transformative shift toward a more sustainable and efficient economic model. By embracing the principles of the circular economy, businesses and individuals can aid in reducing waste, achieving cost savings, and restoring natural resources. Innovative startups are playing a pivotal role in advancing this transition and demonstrating the circular economy's potential to foster a more sustainable future.

Figure 3: *Circular start-ups*

Circular start-ups are poised to play a critical role in advancing the transition to a circular economy and achieving sustainability objectives. Their adaptability to shifting market dynamics

and their inclination to adopt radical circular business models (CBMs) distinguish them from traditional firms. As a result, circular start-ups are expected to gain competitive advantages and excel in development and growth. However, similar to conventional start-ups, they may face significant barriers to scaling up.

Startups that are spearheading innovation in the circular economy frequently attract investment and support from a diverse range of stakeholders, including venture capitalists, impact investors, and government agencies. This financial backing is crucial as it empowers startups to scale their operations and bring their innovative solutions to market.

In conclusion, startups are pivotal in fostering innovation within the circular economy. Their fresh perspectives, agility, technology-driven approaches, and disruptive nature, combined with their capacity to attract investment, position them as key players in the quest for a more sustainable and circular economy. By investing in and supporting these startups, we can expedite the transition to a circular economy and pave the way for a more sustainable future.

1. Startups Offer Innovative Perspectives

Startups play a vital role in fostering innovation within the circular economy by providing fresh perspectives that challenge conventional thinking. Unlike established companies that often adhere to traditional practices, startups are unencumbered by these norms, allowing them to explore creative solutions. For instance, Circularity Capital, an investment firm based in London, actively supports startups focused on developing circular economy solutions. By channeling investment into these ventures, Circularity Capital contributes to advancing innovation and facilitating the transition toward a more sustainable circular economy.

2. Startups Are Agile and Adaptive

The agility and adaptability of startups are critical attributes that drive innovation in the circular economy. These companies are willing to take risks and experiment with new concepts, allowing them to pivot quickly when circumstances change. A prime example is RePack, a Finnish startup that has created a reusable packaging solution tailored for the e-commerce sector. By providing a sustainable alternative to conventional single-use packaging, RePack not only reduces waste but also promotes a more circular delivery system for goods.

3. Startups Utilize Technology for Innovation

Many startups harness advanced technology to propel circular economy innovations. They are designing cutting-edge solutions that employ data analytics, artificial intelligence, and automation to optimize resource utilization and minimize waste. For example, Optoro, a US-based startup, has created a software platform that assists retailers in managing and optimizing their product returns. By decreasing the volume of returned items that end up in landfills, Optoro plays a significant role in advancing the principles of a circular economy.

4. Startups Disrupt Traditional Industries

Startups have the potential to disrupt traditional industries and challenge established norms. Free from the constraints of legacy systems, they can introduce new business models that prioritize sustainability and circularity. A notable case is Too Good To Go, a Danish startup that has developed a mobile application connecting consumers with restaurants and grocery stores to rescue surplus food. By preventing food waste and establishing a market for surplus items, Too Good To Go disrupts the food industry and encourages a more circular approach to food consumption.

References

[1] Dobrynina M.V., Kovalenko D.G. Youth social entrepreneurship: problems and prospects//Economic and social-humanitarian research. 2023. No. 3 (39). P. 53-61.

[2] Guryanova A.V., Timofeev A.V. Noospheric globalization in the context of the sustainable development model // Economic and social-humanitarian studies. 2023. No. 1 (37). P. 103-110.

[3] Garrido MAB, Villar IM (2023) Teaching transversal competences in civil and procedural

law through the sustainable development goals (SDGs). In: Gstrein OJ, et al (eds) Modernising European legal education (MELE). Springer, Cham

[4] N. Dobbeling-Hildebrandt, ¨ K. Miersch, T.M. Khanna, M. Bachelet, S.B. Bruns, M. Callaghan, O. Edenhofer, C. Flachsland, P.M. Forster, M. Kalkuhl, et al., Systematic review and meta-analysis of ex-post evaluations on the effectiveness of carbon pricing, Nat. Commun. 15 (1) (2024) 4147, https://doi.org/10.1038/ s41467-024-48512-w.

[5] Santikarn M; Churie Kallhauge AN; Bozcaga MO; Sattler L; Mccormick MS; Ferran Torres A; Conway D; Mongendre L; Inclan C; Mikolajczyk S; et al.; Washington, D. C.: World Bank Group, 2021.

[6] Taranova I.V., Podkolzina I.M., Uzdenova F.M., Dubskaya O.S., Temirkanova A.V. Methodology for assessing bankruptcy risks and financial sustainability management in regional agricultural organizations// The Challenge of Sustainability in Agricultural Systems. Cep. "Lecture Notes in Networks and Systems, Volume 206" Heidelberg, 2021. С. 239-245.

[7] European Commission (2022a) Communication from the Commission. Guidelines on the application of the Regulation (EU, EURATOM) 2020/2092 on a general regime of conditionality for the protection of the Union budget. Brussels, 2.3.2022 C (2022) 1382 final.

[8] Taranova I.V., Podkolzina I.M., Uzdenova F.M., Dubskaya O.S., Temirkanova A.V. Methodology for assessing bankruptcy risks and financial sustainability management in regional agricultural // Organization. 2021. № 206. С. 239.

[9] Taranova I.V., Tokova L.D., Shavrina J.O., Syrovatskaya V.I., Ivanova E.A. Banking management as the basis for effective management of a commercial bank// Modern Global Economic System: Evolutional Development vs. Revolutionary Leap. Institute of Scientific Communications Conference. Cham, 2021. С. 2137-2144.

[10] Salygin V.I., Deniz D.S. Potential of renewable energy and transformation of the global fuel and energy balance: Theoretical aspects // Issues of Innovative Economics. 2021. Vol. 11. No. 4. P. 1893-1904.