

REGULATORY FLEXIBILITY AND EXPERIMENTATION IN THE CIRCULAR ECONOMY TO PROMOTE EFFECTIVE COMPETITION FOR THE BENEFIT OF CONSUMERS

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Abstract

The lack of an accelerated innovation process is more relevant than ever for the development of the global economy, which has been characterised by a low level of innovation in recent decades. The ability to develop innovative products, services and business models creates social value and is essential for maintaining competitiveness, which ultimately benefits consumers.

Given that almost half of the CO₂ emission reductions required by 2050 will have to come from technologies that are not yet available on the market, a significant innovation effort will have to be launched within this decade. Regulatory flexibility and experimentation in the circular economy will be essential to encourage the development, testing and deployment of breakthrough solutions and ensure that the EU remains at the forefront of sustainable innovation and global competitiveness.

Key challenges in advancing the circular economy and achieving climate neutrality lie in striking a balance between encouraging innovation and ensuring robust consumer protection. One promising approach is the establishment of a Circular Economy Sandbox, which is a regulatory innovation space designed to test new models and technologies under controlled conditions. Any proposed project must demonstrate that consumer protection will be ensured throughout the implementation phase to be approved. The Sandbox operates under strict ethical and environmental standards to ensure that all innovations align with sustainability principles and respect consumer rights.

The article provides a basis for in-depth discussions on the development and implementation of transformative strategies in the circular economy sector. Key transformations such as digitalisation, decentralisation, decarbonisation, sustainability, consumer empowerment, innovative financing, low-carbon gases, circularity, sustainable raw material supply and carbon removal require extensive research, regulatory experimentation and innovation to drive effective and sustainable solutions.

Keywords: circular economy; regulatory flexibility; regulatory sandbox; innovation; consumer protection; sustainability; competition policy; climate neutrality

JEL Classification: K38, K38, Q 54

1. INTRODUCTION

A regulatory sandbox is a regulatory framework that allows market participants to test new services or models with live customers, subject to certain safeguards and oversight. Sandboxes help to develop and test market innovations, achieve legal security, and foster innovation and regulatory learning. Sandboxes have gained prominence as an intervention across the world. Currently, 73 regulatory sandboxes are operational across 57 jurisdictions. FinTech is the area in which regulatory sandboxes are most used. The first sandbox was implemented in the United Kingdom in 2016. It offered fintech enterprises a less rigorous environment in which to innovate while being supervised.

In accordance with the Regulatory Sandboxes: A Practical Guide for Policymakers (Michael Rizzo, 2021) the advantages of operationalising sandboxes are follows: (i) regulators can obtain first-hand empirical evidence on the implications of emerging technologies; (ii) innovators and companies can develop a better understanding of the regulations governing their products and adapt them accordingly; (iii) sandbox participants can also test their products' viability without the need for a larger, more expensive rollout. While up to 80% of products' environmental impacts are determined at the design phase, the linear pattern of "take-make-use-dispose" does not provide producers with sufficient incentives to make their products more circular. Many products break down too quickly, cannot be easily reused, repaired or recycled, and many are made for single use only. (European Commission, 2012)

The new Circular Economy Action Plan, titled For a Cleaner and More Competitive Europe, puts consumers at the heart of the transition towards sustainable growth and the EU's goal of achieving climate neutrality by 2050. Circular strategies can reduce emissions by 9.3Gt CO₂e in 2050, around 40-45% of emissions from the production of goods. (Johan Rockström *et al.*, 2018). Moreover, (Ghisellini *et al.*, 2016, p.19) emphasize that "the promotion of consumer responsibility is crucial," while (Lieder and Rashid, 2016, p.45) highlight that circular supply chains should account not only for production and distribution, but also for consumption processes.

Consumers play a pivotal role in enabling circular business models (Gallaud and Laperche, 2016), making the consumer perspective an essential counterpart to the innovative business model aspect of the circular economy. The innovation performance of the EU has increased by 8.5 percentage points since 2016. Between 2016 and 2023, performance differences among the 27 Member States have become somewhat smaller. (European Innovation Scoreboard 2023)

Demand is an important driver of innovation. Trust is important for developing the idea of a circular economy sandbox that uses consumer demand to drive innovation. This sandbox would have a built-in feedback mechanism to test and refine eco-innovative products in a real yet protected environment. This study highlights that circular innovation involves more than just supply-side efforts, it critically depends on consumers' willingness to adopt and maintain sustainable behaviours.

2. DATA AND METHODOLOGY

In order to fulfil the objective of this article, which is to evaluate the significance of the circular economy as an approach to sustainable development policies and the development of innovations in this area based on consumer interests and rights protection, primary information on the circular economy was gathered from official European Commission websites, specialized digital journals and other pertinent sources.

This analysis uses an interdisciplinary approach, combining EU legal instruments, doctrinal analysis, examination of good practices and assessment of the impact of environmental regulations on consumer rights effectiveness. The research draws on legal sources at EU, national and international levels, as well as on relevant regulatory sandbox practices in other countries. From a practical standpoint, the creation of a regulatory circular economy sandbox is inspired by a thorough review of various regulatory sandbox concepts (Australia, Dubai, India, etc.).

In addition, the methodology integrates comparative analysis and desk research techniques to identify transferable elements and contextual barriers for implementing circular economy innovation frameworks tailored to consumer needs. Furthermore, the research employs a multi-level governance approach to examine how consumer protection objectives can be incorporated into experimental regulatory frameworks without compromising legal certainty or market integrity. This layered methodology enables both conceptual exploration and the formulation of policy-relevant recommendations for advancing a consumer-centric circular economy through innovative regulatory instruments.

3. REVIEW OF THE LITERATURE

Introducing a regulatory sandbox in the circular economy sector will offer significant benefits to innovative companies and entrepreneurs looking to implement experimental projects, as well as to foreign investors who are attracted by a more flexible regulatory framework. The resulting influx of foreign investment will generate broader positive impacts on the sustainable economy, including boosting GDP, creating jobs and fostering a higher level of innovation.

The sandbox approach originated in the financial technology sector and has since begun to be adopted in healthcare for the development of regulatory policies relating to innovative technologies. Sandboxes are being used increasingly in healthcare regulation to facilitate the development of policies, methods, and processes for innovative and disruptive health technologies. This approach has considerable potential for use in low- and middle-income countries (Emily Leckenby *et al.*, 2021).

An overview of global sandbox programmes in the financial sector notes that they enable innovations aimed at consumers to be tested under lighter regulation, thereby improving regulatory oversight and consumer protection. Although these core principles, regulated experimentation, built-in consumer protection and data-driven policymaking, are focused on financial technology, they can be applied directly to circular economy sandboxes involving packaging, reuse and resource recovery (Ryan Nabil, 2022). In addition to the benefits, each testing framework should incorporate mechanisms that fulfil the general regulatory objectives, particularly those relating to consumer protection. Gertraud Leimüller *et al.* (2020) emphasises that sandboxes must include safeguards for health, consumers and the environment.

By creating innovative circular products and circular business models from scratch, entrepreneurs can offer efficient and coordinated solutions to environmental problems (Blomsma *et al.*, 2023). However, how entrepreneurs design circular products and business models in parallel, given their complete freedom of design, remains largely unknown (Blomsma *et al.*, 2023). In his work, Henry Willem Müller (2025) analyses the application of the sandbox model in the circular economy. He concludes that five out of a total of 15 analysed projects made intensive use of the Circular Systems Sandbox mechanism. Empirical results demonstrated superior performance compared to projects that applied alternative tools, particularly in terms of design consistency, business model viability and reduction of rebound effects.

Circular economy sandboxes allow innovative business models, such as reusable packaging and waste-to-resource systems, to be tested in the real world within a controlled regulatory framework that encourages innovation and fosters competition. These environments are designed with built-in safeguards, including defined coverage limits, continuous monitoring, and clear exit strategies, to protect consumers and prevent potential risks.

4. THE CHALLENGES ASSOCIATED WITH THE CIRCULAR ECONOMY SANDBOX

4.1. Constraints in the implementation of innovations within regulatory sandboxes

It is important to note that pilot approaches are sometimes used in EU countries to experiment with innovation in the areas described below. However, only the 'innovative testing project or regulatory sandbox' approach delivers the benefits.

Participation constraints. The analysis of innovation developments has highlighted several issues relating to participation in innovative testing projects. In general, large enterprises have found it easier to engage in such projects, while smaller enterprises may be excluded. Smaller businesses have faced multiple challenges in participating, including a lack of awareness of existing innovative testing programmes, confusion regarding their objectives and outcomes, and limited internal capacity to develop, implement and comply with the associated regulatory requirements.

Promoting innovation in business. Consequently, while many sandboxes have enjoyed some degree of success, others have faced bottlenecks and challenges, including failing to encourage firms to participate (The World Bank, 2020). This is one of the two main objectives of innovative testing projects, and the intention to derogate from the existing regulatory framework is most frequently requested for this purpose. Such derogations are often sought to create a more flexible environment for experimentation, particularly where traditional regulations may hinder the development or testing of novel approaches. Innovations and regulatory experiments are expected to become more prevalent in the field of reused, repaired or recycled products and materials, where existing legislation may not adequately support circular business models. These areas often involve complex value chains and cross-sectoral compliance requirements, necessitating the temporary relaxation of certain rules to facilitate the testing of innovative solutions (Iarmenco Mihaela, 2020).

Distortion of competition. The most frequently discussed risk associated with innovative testing projects is that they usually permit regulatory exemptions for certain businesses, but not for all market participants. This can lead to market distortions. If these distortions are maintained for too long, they can disrupt fair competition. Furthermore, businesses participating in such projects generally incur lower compliance costs, which gives them an implicit advantage. This could not only distort competition with existing market players, but also create higher barriers to entry, even after the project concludes.

To mitigate this risk, the regulatory framework for innovation should incorporate transparent eligibility criteria, transparent and objective selection procedures, and clear and robust knowledge-sharing obligations.

The need for a legal framework. A regulatory framework for innovative testing projects should define the conditions under which exemptions may be granted and specify the criteria for evaluating such requests. These evaluation criteria would ensure that applicants meet the minimum requirements for safe and appropriate testing activities. Applications for projects should be subject to a criterion stating that the applicant has consulted with relevant stakeholders.

4.2 Designing a Sandbox

Sandboxes are useful for boosting innovation and providing regulatory guidance. Designing and operationalising sandboxes requires an in-depth understanding of their context and objectives. The prominent types of sandbox around the world are given below.

Table 1. Types of Sandboxes

	Innovation-promoting Sandbox	Policy-promoting Sandbox	Thematic Sandbox
Objective	● Market development ● Regulatory learning	● Identify regulatory blockers to beneficial innovation	● Develop evidence to support regulatory enablers. ● Targeted market development
Capacity	● Process & manage large cohorts. ● Informal guidance & feedback	● Facilitative regulatory architecture	● Clear thesis on regulatory or policy objectives

Table 2. Regulatory Sandboxes Across the Globe

Country	Type of Sandbox	Sector	Authority/ Regulator	Description
Australia¹	Singular Sandbox	Finance	Australia Securities and Investment Commission (ASIC)	Australia introduced the Australian Licensing Exemption Scheme, under which the Australian Securities and Investment Commission (ASIC) introduced a fintech licensing scheme. This scheme allows eligible fintech companies to test

¹ Australia Investment and Securities Commission

Country	Type of Sandbox	Sector	Authority/Regulator	Description
				certain products or services for up to 12 months without an Australian Financial Services licence or credit licence.
Thailand²	Three separate sandboxes under different authorities	Finance	Bank of Thailand (BOT), the Securities and Exchange Commission (SEC), and the Office of Insurance Commission (OIC)	The BOT sandbox has focused primarily on quick-response (QR) codes and cross-border payments. The OIC sandbox, on the other hand, targets InsurTech innovations. The SEC sandbox enables fintech companies to trial eKYC technologies. ³
Dubai⁴	Singular Sandbox	Finance	Dubai Financial Services Authority (DFSA)	Dubai has introduced an Innovation Testing Licence (ITL), which gives eligible fintech firms the chance to trial innovations in a controlled environment.
Lithuania⁵	Singular Sandbox	Blockchain in financial sector	Bank of Lithuania	Lithuania has launched a blockchain-based sandbox to accelerate the development of blockchain innovations in the financial sector.
Sierra Leone⁶	Singular Sandbox	Finance	Bank of Sierra Leone	This sandbox encourages responsible innovation, aiming to enhance the quality and accessibility of financial products for citizens of Sierra Leone.

² The Nation - Thailand

³ World Bank - Global experiences with regulatory sandboxes

⁴ Dubai Financial Services Authority

⁵ Bank of Lithuania

⁶ Bank of Sierra Leone

Country	Type of Sandbox	Sector	Authority/Regulator	Description
Rwanda ⁷	Three Sandboxes under Bank of Rwanda	Finance	Bank of Rwanda	In 2018, Rwanda established a sandbox focused on payment systems. This was followed by the creation of two more sandboxes, one dedicated to micro-insurance and the other to deposit-taking institutions. ⁸
Kenya ⁹	Singular Sandbox	Finance	Capital Markets Authority of Kenya (CMA)	This sandbox enables the development and implementation of innovative products, solutions and services related to capital markets.
Mozambique ¹⁰	Singular Sandbox	Finance	Banco de Moçambique (Central Bank of Mozambique)	This sandbox offers FinTechs, credit institutions, financial companies, payment service providers, and other financial institutions the chance to trial their innovative technologies and business models. It has also acted as an accelerator by enabling start-ups to implement their products and models in the real world.
Ghana ¹¹	Singular Sandbox	Finance	Bank of Ghana	The Bank of Ghana has launched a regulatory sandbox pilot programme in collaboration with Emtech Service LLC. The sandbox focuses on financial services, with a particular emphasis on

⁷ National Bank of Rwanda

⁸ World Bank - Global experiences with regulatory sandboxes

⁹ Capital Markets Authority

¹⁰ Bank of Mozambique

¹¹ Bank of Ghana - Press Release

Country	Type of Sandbox	Sector	Authority/ Regulator	Description
				blockchain technology solutions, electronic Know Your Customer (KYC) processes, remittances and crowdfunding.
Nigeria¹²	Singular Sandbox	Finance	Central Bank of Nigeria	In 2020, the Central Bank of Nigeria (CBN) released the draft Framework for Regulatory Sandbox Operation. The sandbox was designed to support disruptive technology in the financial services sector.
Mexico¹³	Sandboxes established under fintech law	Finance	Comisión Nacional Bancaria y de Valores (CNBV)	Mexico enacted its fintech law to encourage innovation and make its regulatory environment more favourable to new technologies. The law established a fintech supervision department within the Comisión Nacional Bancaria y de Valores (CNBV), responsible for setting up regulatory sandboxes.
India¹⁴	Three parallel sandboxes under each regulator	Finance	Reserve Bank of India (RBI) ¹⁵ , Securities Exchange Board of India (SEBI) ¹⁶ and the Insurance Regulatory and Development	The three regulators have launched sandboxes to promote responsible fintech. However, their designs differ, particularly with regard to eligibility criteria and testing environments.

¹² Regulatory Sandbox - Central Bank of Nigeria

¹³ Fintech Business Weekly

¹⁴ World Bank - Global experiences with regulatory sandboxes

¹⁵ RBI - Sandbox

¹⁶ SEBI Sandbox

Country	Type of Sandbox	Sector	Authority/ Regulator	Description
			Authority of India (IRDAI) ¹⁷ .	
Colombia ¹⁸	Singular Sandbox	Finance	Superintendencia Financiera de Colombia (SFC)	As part of its sandbox mechanism, the SFC issued temporary licences to participants in the sandbox before deciding on any permanent regulatory changes.
Hong Kong ¹⁹	Three separate sandboxes under each regulator	Finance	Insurance Authority, Securities and Futures Commission and Hong Kong Monetary Authority (HKMA)	The three financial sector regulators: the Insurance Authority; the Securities and Futures Commission; and the Hong Kong Monetary Authority (HKMA), have launched their own sandboxes, which focus on cross-sector fintech products.

Reasons for establishing sandboxes:

- Regulatory sandboxes and other related innovation frameworks provide innovators with temporary legal certainty, at the very least.
- Environmental regulators and other authorities are not otherwise empowered to implement regulatory experimentation mechanisms, as this is not explicitly mentioned in their mandates.
- Any experimentation must be designed to avoid distorting competition and protect consumers.
- Use the insights gained from the sandbox intervention to secure additional funding from the wider IFI/donor community and private sector.

Barriers to operationalising sandboxes in the aforementioned practical cases:

- Lack of innovation in the circular economy sector.
- Lack of policy and regulatory mechanisms surrounding energy sandboxes.
- Undemonstrated technical and financial viability of innovative technologies and business models in the circular economy.
- Lack of private sector investment in the circular economy sector.

¹⁷ IRDAI Sandbox

¹⁸ Colombia Regulatory Sandbox

¹⁹ Hong Kong Regulatory Sandbox

- Lack of incentive for the development of innovative business models and technologies.
- Capacity issues in the circular economy sector.
- A gap between market needs and regulatory frameworks.

5. LEGAL FRAMEWORK FOR THE CIRCULAR ECONOMY SANDBOX

5.1. EU strategic regulatory framework

As previously mentioned, regulatory sandboxes are a well-established and widely implemented form of regulation at the European level. By way of example, the main European legal acts that refer to regulatory experimentation schemes are recalled below:

The revised *Better Regulation Toolbox*, published in 2021, includes regulatory sandboxes as part of Tool No. 69, “Emerging policy methods and tools”, and outlines best practices for their implementation. The Toolbox facilitates the identification and removal of barriers within the single market. The European Commission has emphasised that 'overregulation' often results in additional administrative or regulatory burdens for consumers and businesses, particularly affecting SMEs (European Commission, 2021),

The 2020 European Council conclusions on regulatory sandboxes emphasise the need to develop tools within a resilient, future-oriented regulatory framework capable of addressing the challenges of the digital age. The conclusions endorse the use of regulatory sandboxes and experimentation clauses and advocate their incorporation into EU legislation. The Council emphasises that sandboxes and experimentation clauses must consistently adhere to the principles of subsidiarity, proportionality and the precautionary principle, and actively promote their application. These mechanisms must ensure a high level of protection, particularly for citizens and consumers (European Council conclusions, 2020).

The 2022 communication, *A New European Innovation Agenda*, indicates that resources from the Horizon Europe programmes and the Interregional Innovation Investment Instrument under the European Regional Development Fund will be dedicated to promoting regional collaboration, including the use of regulatory sandboxes (COM, 2022).

The European Commission’s draft *Regulation, which establishes a framework of measures to strengthen the European ecosystem for producing technologies that contribute to the “zero emissions”* objective, includes a dedicated article on regulatory sandboxes for these technologies. It allows Member States to temporarily derogate from applicable regulatory rules to facilitate innovation and real-world testing. The strategic document also emphasises the essential role of end consumers in driving demand for final

products based on technologies that contribute to achieving the Union's net-zero emissions goal (COM, 2023).

Moreover, the recent report entitled "Much More Than a Market", prepared by Enrico Letta at the request of the European Council highlights that the Single Market should be built upon a fifth pillar, beyond the free movement of goods, capital, persons and services, namely the freedom to innovate. Only by ensuring a framework conducive to innovation can an ecosystem be created in which knowledge drives economic vitality and broader societal progress. The report also recommends the increased use of regulatory sandboxes as a tool for systemic flexibility, offering legal stability without rigidity (Enrico Letta, 2023).

5.2. The concept of the circular economy sandbox regulatory framework to ensure consumer protection

The draft Law on Regulatory Sandboxes for the Circular Economy aims to stimulate innovation in this sector, accelerating the process by which its results are brought to market. This will benefit consumers and contribute to the Republic of Moldova's decarbonisation objectives.

The draft legislation also aims to introduce the concept of regulatory flexibility, which is already implemented in most EU Member States and recognised in European Union legal acts. This concept allows for improvements to the regulator's learning curve and encourages technological progress.

To stimulate innovation in the circular economy sector, the draft Law on Regulatory Sandboxes for the Circular Economy allows for exemptions from regulatory provisions that hinder the implementation of testing projects or innovation-focused experiments. To ensure consumer protection and safeguard public interest, the draft legislation sets out strict requirements and a clear decision-making framework to prevent any negative impact on the energy sector or other regulated areas where such exemptions are sought (Plotnic Olesca, 2022).

The mechanisms designed to guarantee neutrality and safety include:

- (i) the establishment of eligibility criteria for innovative testing projects, including the requirement that each project demonstrate the ability to ensure consumer protection from the implementation stage;
- (ii) a rigorous approval mechanism involving multiple layers of analysis and decision-making, specifically:
 - the creation of a collegial body (the Committee for Regulatory Sandboxes), composed of members with relevant expertise and supported by a technical secretariat of experts;
 - the final approval decision to be adopted by the Government, which has the necessary authority to issue informed and responsible decisions;
 - mandatory consultation with competent institutions and public authorities responsible for issuing opinions, approvals, or

authorizations in relation to the legal provisions for which derogation is requested;

- the inclusion of the option to consult interested third parties in the decision-making process.
- (iii) the possibility for the approval decision to impose specific conditions aimed at ensuring consumer protection;
- (iv) the establishment of clear monitoring mechanisms for the implementation of approved projects, allowing for early detection and correction of any deviation from the established conditions;
- (v) the enforcement of legal liability civil, administrative, or criminal, where legal provisions that are not subject to approved exemptions are violated.

Therefore, the draft Law proposes a robust framework for the verification and filtering of regulatory sandbox projects in the circular economy field, ensuring a balanced approach between fostering innovation and protecting the public interest.

At the same time, it should be emphasised that the draft Law aims to stimulate innovative testing projects which, due to current legal provisions (i.e. a lack of flexibility in the existing regulatory framework), cannot be implemented, or can only be implemented with significant difficulty and/or over a much longer timeframe.

The draft Law's mechanism involves identifying such legal provisions and integrating innovation into the economic cycle. These obstacles are encountered by applicants who drive the respective innovations. Therefore, it is impossible to anticipate the specific innovative testing projects or the exact legal provisions for which exemptions will be needed to implement them.

For this reason, the normative acts from which derogations may be granted are listed in general terms. However, it must be clearly stated that no general exemptions will be granted through the approval decisions for regulatory sandbox projects in the circular economy sector. In full respect of the principle of proportionality, the government will grant specific exemptions from legal provisions that hinder innovation, but only those strictly necessary for a project's implementation will be granted based on a case-by-case analysis.

6. CONCLUSIONS

In order to implement such innovative projects, it is necessary to establish a specific regulatory framework that allows for derogation from certain rules. This will enable innovative projects to be carried out under controlled and supervised conditions while ensuring consumer safety.

Overall, innovative testing projects can foster significant openness to innovation. As a result, competition is encouraged within the framework of a

given project. Furthermore, different projects can compete with one another, ultimately leading to improvements in the regulatory framework that enable more and better innovation and promote greater competition within and across markets.

In addition to the benefits outlined in *Regulatory Sandboxes: A Practical Guide for Policymakers* (Michael Rizzo, 2021), we can also emphasise the advantage of a controlled environment for safeguarding consumer interests. Innovative testing projects involve conducting experiments in real-world yet controlled conditions using rigorous analysis and verification mechanisms. This ensures that such initiatives do not negatively impact consumers and that their rights are fully protected throughout the innovation process.

Innovative testing projects are practical experiments that usually involve a small number of consumers. This ensures that any regulatory exceptions have a minimal impact on end users. Furthermore, the process of granting these exemptions includes verification and assessment filters to prevent negative impacts on consumers or distortions to competition among market operators.

In conclusion, there is a growing trend at the European level towards the use of regulatory sandboxes for innovative testing. The draft Law on Regulatory Sandboxes for the Circular Economy provides adequate verification and filtering mechanisms to protect consumers and safeguard the public interest. Therefore, to effectively implement such sandboxes and advance innovation more broadly, it is necessary to grant general derogations from certain legal provisions. (such as those relating to spatial planning, construction, environmental protection or tax procedures)

The Sandbox mechanism operates under strict ethical guidelines, ensuring that innovation is consistent with environmental sustainability and consumer rights. All projects tested in the Sandbox integrate a consumer-centric approach, prioritising transparency, safety and reliability. Companies participating in the Sandbox must demonstrate clear benefits for consumers, such as improved product circularity, cost reduction or improved service reliability.

To safeguard consumer rights while fostering innovation, circular economy sandboxes must incorporate robust protection mechanisms:

- rigorous project screening: only projects that pass a strict pre-assessment, demonstrating minimal risk to consumers, are admitted;
- ongoing consumer impact monitoring: consumer effects are tracked continuously during testing to detect any emerging issues early;
- rapid response protocols: clear clauses ensure immediate intervention in case of risks or violations of consumer protection standards.

Additionally, all sandbox-tested projects must deliver tangible consumer benefits, such as:

- enhanced product circularity through extended lifespan, reuse, repairability, or recyclability;

- lower costs for sustainable products and services by reducing waste and increasing efficiency;
- improved service reliability via testing in real-world conditions before full-scale rollout;
- greater transparency, with consumers having access to clear, accurate data on the environmental and social impacts of tested innovations.

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