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LEGAL ADAPTATION STRATEGIES FOR UNFORESEEN EVENTS IN THE CIRCULAR ECONOMY THROUGH THE INTEGRATION OF RESILIENCE AND MATERIAL REUSE

OLESEA PLOTNIC
Academy of Economic Studies of Moldova
Chișinău, Republic of Moldova
plotnicolesea.aum@gmail.com

VALERIA PRAPORȘCIC
State University of Moldova
Chișinău, Republic of Moldova
valeriapraporscic97@gmail.com

Abstract
The circular economy is essential for sustainable development, promoting the reuse of resources and waste reduction. This article explores legal adaptation strategies to address unforeseen events in the circular economy, highlighting the importance of integrating resilience and material reuse. The purpose of this article is to analyze how current legislation at both European and national levels addresses risks and unforeseen events and to propose improvements for better integration of these concepts.
The main objectives include examining ways in which material reuse contributes to adaptability, evaluating existing contractual clauses, and proposing adaptability clauses for risk management. The case study of the "Close the Glass Loop" program in the glass industry is used to illustrate the practical application of these strategies and to demonstrate the success of a circular economy initiative in the context of disruptions caused by the COVID-19 pandemic. Expected outcomes include a better understanding of the importance of adaptability clauses in contracts and the need for flexible and innovative regulations.
Legislative improvement proposals aim to introduce adaptability clauses, promote investments in innovative technologies, and intensify public education campaigns. These measures could contribute to increased resilience and sustainability of the circular economy, providing a robust legal framework to facilitate the transition to more sustainable and efficient economic practices.
In conclusion, this article emphasizes the need to adapt legislation to address the challenges of the circular economy and proposes concrete solutions for integrating resilience and material reuse into the existing legal framework, thereby contributing to the creation of a sustainable and resilient economic model.
Keywords: *circular economy; legal adaptation; resilience; material reuse; unforeseen events.*

JEL Classification: A11, D5, K10, K12.

1. INTRODUCTION

In a world where resources are increasingly limited and the pressure on the environment is growing, the circular economy has become a key concept in the search for a sustainable economic model. Essentially, the circular economy is based on the idea of replacing the traditional "take, make, dispose" model with one where resources are used efficiently, and waste is transformed into new resources or reintegrated into the economic cycle.

However, within the circular economy, not everything always goes according to plan. Unforeseen events, such as natural disasters, sudden changes in market demand, or disruptions in supply chains, can significantly impact the functioning of the system and test its resilience.

In this context, legal adaptation plays a crucial role in ensuring that the circular economy can cope with and adapt to these challenges. This legal adaptation involves the development and implementation of policies, regulations, and legal instruments that facilitate efficient resource management and provide a flexible framework to manage risks and unforeseen events.

Moreover, it is important to analyze and understand how these principles and strategies apply at the local level, such as in the Republic of Moldova. In recent years, Moldova has made significant strides towards a more circular economy, adopting policies and programs that promote reuse, recycling, and sustainable resource management. By exploring these concrete examples of policies and legal initiatives, we can better understand how concepts of resilience and material reuse can be integrated into the existing legal framework and how new strategies can be developed to face future challenges.

In this paper, we aim to analyze and evaluate these aspects, highlighting the importance of legal adaptation in the circular economy and providing specific examples of policies and legal practices in the Republic of Moldova. These examples can serve as models and sources of inspiration for other countries and regions in their quest for a more sustainable and resilient economy, both in everyday life and in emergency situations.

2. DATA AND METHODOLOGY

This article employs a mixed methodological approach to explore legal adaptation strategies in the circular economy and their impact on managing unforeseen events. The analysis is based on updated legislation, programs implemented at the European and national levels, as well as relevant case studies. Updated legislation and implemented projects were analyzed: at the European level, essential regulations such as the Circular Economy Package and the Waste Framework Directive were examined. These documents establish the legal framework for waste reduction and the promotion of material reuse. At the

national level, the legislation of the Republic of Moldova was studied in detail, including the Green Economy Promotion Program and the National Development Strategy "Moldova 2030". These sources reflect the country's commitment to transitioning to a circular economy.

Additionally, successful programs and initiatives implemented at both European and national levels were evaluated. A notable example is the "Close the Glass Loop" program in the glass industry, which has demonstrated efficiency in increasing the collection and recycling rate of glass. In the Republic of Moldova, various waste management and recycling initiatives were analyzed to assess their impact on sustainability and economic resilience.

The methodology used in this article refers to legislative analysis, document analysis, and case studies. Legislative documents, government reports, and case studies were collected and analyzed to understand the legal framework and its impact on the circular economy. A comparative method was also used regarding the circular economy at both national and international levels.

3. LITERATURE REVIEW

Specialized literature provides a solid foundation for understanding the circular economy, relevant legislation, and adaptation strategies in the face of unforeseen events. This section synthesizes the main contributions of existing literature and identifies future research directions. Numerous statistical studies emphasize the importance of the circular economy for sustainable development. Resource reuse and waste reduction are essential for environmental protection and economic optimization. Various initiatives and platforms like “Close the Glass Loop” highlight the need to integrate circular economy principles into national and international policies. European regulations, such as the Circular Economy Package and the Waste Framework Directive, offer a comprehensive framework for promoting circular practices. In the Republic of Moldova, recent policies and programs promoted by the Ministry of Environment demonstrate an increased commitment to implementing green and circular economies.

The literature on the circular economy and legal adaptation strategies has evolved considerably, with scholars like Kirchherr, Reike and Hekkert (2017) emphasizing the significance of well-defined legal frameworks to promote material reuse and systemic adaptability. Zamfir (2020) highlights the role of legislation in supporting technological innovations and reducing material waste, pointing to the necessity for legal instruments that foster sustainable industrial practices. Similarly, Negrei and Istudor (2018) focus on bridging theoretical approaches to the circular economy with practical, adaptable legal mechanisms. Researchers like Amarița (2006), Plotnic and Popescu (2022) further examine how force majeure clauses within contractual frameworks can mitigate risks in crisis situations, such as those posed by the COVID-19 pandemic, thereby ensuring business continuity. Case studies from Moldova’s “Moldova 2030”

strategy and the EU's "Close the Glass Loop" initiative illustrate the efficacy of public-private partnerships in advancing circular economy goals, as highlighted by Dulgheru (2023) and Plotnic and Praporscic (2023). This extensive body of literature underscores the interconnectedness of legal frameworks, sustainability policies, and economic resilience in the circular economy transition

The literature explores various legal adaptation strategies for managing unforeseen events. Force majeure clauses and adaptability are studied in the context of the COVID-19 crisis, highlighting the need for flexible regulations that allow for the renegotiation of contractual terms. This article contributes to the existing literature by providing a detailed analysis of legal adaptation strategies and proposing improvements to better integrate resilience and material reuse concepts into current legislation.

Legal frameworks are crucial in facilitating the transition to a circular economy. Kirchherr, Reike and Hekkert (2017) emphasize that clear legal definitions and regulations are necessary for promoting circular economy practices, which include the reuse of materials and resilience to disruptions. Negrei and Istudor (2018) discuss the gap between theory and practice in circular economy implementation, highlighting the need for legal mechanisms that can adapt to unforeseen events.

The concept of force majeure plays a significant role in legal adaptation strategies, especially in contracts related to the circular economy. Amarița (2006) provides an overview of the force majeure clause in comparative law, illustrating its importance in protecting parties from liabilities during unforeseen events. Plotnic and Popescu (2022) further analyze the impact of force majeure on intellectual property contracts, which is particularly relevant in the circular economy where innovation and IP rights are integral.

3.1. Resilience and material reuse

Resilience in the circular economy involves the capacity of systems to absorb disturbances and reorganize while undergoing change. The integration of resilience into legal frameworks is essential for ensuring the durability and adaptability of circular economy practices. The European Environment Agency (2024) emphasizes the need for legal structures that support resilience by allowing flexible responses to economic and environmental challenges. Material reuse is another cornerstone of the circular economy, not only it reduces waste but also builds resilience by decreasing dependency on virgin resources. The work of Kirchherr, Reike and Hekkert (2017) is critical in understanding the various strategies for material reuse and the legal frameworks needed to support these strategies. Dulgheru (2023) discusses innovative business models in the circular economy, highlighting the legal challenges and opportunities in material reuse.

3.2. Case studies and applications

The Moldovan context provides a practical example of how legal adaptation strategies are being implemented in response to unforeseen events. Akhalkatsi, Jolevski and Rovo (2021) discuss the increasing anxiety among Moldovan companies during the pandemic, emphasizing the need for legal frameworks that support resilience. The Government Decision no.12/2021, which approves the "Moldova 2030" National Development Strategy, underscores the importance of adapting legal frameworks to promote a circular economy in the face of global challenges**.**

The EU4 Environment (2024) program for promoting the green and circular economy in Moldova outlines government priorities and legal measures aimed at enhancing resilience and promoting material reuse. These initiatives are crucial for aligning Moldova's economic strategies with the principles of the circular economy.

BMW (2024) and other industry leaders are also adopting circular economy practices, with a focus on resource conservation and material reuse. These practices highlight the role of legal frameworks in supporting industry adaptation to unforeseen events.

The integration of resilience and material reuse into legal frameworks is essential for advancing the circular economy. The literature highlights the importance of force majeure clauses, adaptable legal structures, and supportive government policies in fostering a resilient circular economy. The Moldovan case provides a practical example of how legal adaptation strategies can be implemented to address unforeseen events, ensuring the sustainability and success of circular economy practices. This review underscores the need for continuous adaptation and innovation in legal frameworks to support the evolving demands of the circular economy. By doing so, societies can better manage unforeseen events and move towards a more sustainable and resilient future.

4. CIRCULAR ECONOMY: PRINCIPLES AND IMPLEMENTATION

The economy is an open system, realizing both material and energy exchanges. While material flows can be "circularized" to some extent, energy flows are unidirectional, with the law of entropy being a strict and objective natural law. From this perspective, we cannot conceptually speak of a "circular economy." However, it is essential to note that due to the persistence of mechanistic views, the concept of a "circular economy" has emerged in some works. Under this name, it refers to the cyclicality of real phenomena and processes, directly linking to the cyclicality of natural phenomena and processes. "The objective of the circular economy (...) is to reproduce the quasi-cyclic functioning of natural ecosystems" (Negrei and Istudor, 2018).

The concept of a circular economy emerged in the late 1970s in response to the aspiration for sustainable growth amidst the increasing pressure exerted by production and consumption on the planet's resources and environment. Until now, the economy has primarily operated on the "take-make-dispose" model, a linear model where each product has a limited lifespan. With the transition to a circular economy, the focus shifts to reusing, repairing, refurbishing, and recycling existing materials and products (Dulgheru, 2023).

Regarding the Republic of Moldova, although rapid steps are being taken towards developing a circular economy, the situation is not very favorable. According to statistical data reported by News Maker, Moldova generates at least 3 million cubic meters of waste annually, which is a significant amount given the population size. Of this, two-thirds is generated by the population, and the remaining third by enterprises (Gotisan, 2022). However, considering that Moldova is a developing country striving to keep up with European states and currently holds the status of an EU candidate country, significant movements are observed regarding the circular economy. This is also evident in the project promoting a green and circular economy in Moldova.

Most national economies encourage consumerism, affecting the environment and depleting natural resources. To address these issues, a transition to circular business models is necessary to reduce resource consumption and minimize environmental impact. Sustainable development has thus become a central pillar for both the European Union and international cooperation at regional and national levels. Sustainable development aims to decouple economic growth from environmental degradation and reduce social inequalities (Parliament of the Republic of Moldova, 2024).

In an era where the circular economy is becoming increasingly important for promoting sustainability and reducing environmental impact, unforeseen events pose a significant threat to these efforts. From natural disasters to public health crises and political changes, the circular economy is often tested by unpredictable situations.

One of the main aspects is the risk and impact that unforeseen events have on the supply chain and recycling processes. For example, a natural disaster can disrupt material and waste flows, causing interruptions in recycling and reuse activities. These situations can create additional pressures on resources and lead to delays in production and consumption cycles. Managing unexpected waste is another major challenge associated with unforeseen events. During crises such as pandemics or natural disasters, large quantities of waste can be generated rapidly, and the capacity to manage them may be overwhelmed. This can lead to waste accumulation and negative impacts on human health and the environment. To address these challenges, effective strategies and tools are necessary. Flexibility and adaptability in circular economy models are essential for coping with unexpected changes and responding quickly to crises.

5. ESTABLISHING THE CONCEPT OF RESILIENCE IN THE CIRCULAR ECONOMY

Resilience in the circular economy is an essential concept for the sustainable and enduring development of society. In a world where natural resources are finite and the demand for products and services continues to grow, it is crucial to adopt economic models that not only reduce waste and conserve resources but also strengthen the capacity of economic and social systems to withstand and adapt to various shocks and disruptions. Resilience thus refers to a system's ability to resist, adapt, and recover quickly from shocks and disturbances (IEACR, 2023).

In the context of the circular economy, it is important to understand that when we talk about resilience, we are also referring to the diversification of raw material sources. The circular economy promotes the use of recycled materials and renewable sources, thereby reducing dependence on finite and vulnerable natural resources, which are susceptible to price and availability fluctuations. Another important aspect of resilience is product durability. Products designed to be durable, repairable, and reusable contribute to a more robust economy that can better withstand unforeseen situations, such as supply crises or sudden increases in raw material prices. Additionally, innovation and adaptability are crucial, as the circular model encourages continuous innovation in product design and production processes, making businesses more adaptable and capable of responding quickly to market changes and new regulations.

An equally important aspect is the creation of local communities and economies. The circular economy can stimulate local economic development and create jobs through community-level reuse and recycling initiatives. This can lead to more cohesive communities that are less vulnerable to external shocks.

Therefore, the benefits of resilience in managing unforeseen events are numerous and extend to economic, social, and environmental levels. These benefits can help organizations and communities navigate crises more efficiently and recover more quickly, ensuring long-term stability and continuity (Kirchherr *et al.,* 2017).

6. THE ROLE OF MATERIAL REUSE IN PROMOTING RESILIENCE IN THE CIRCULAR ECONOMY

Regarding the reuse of materials, it is an essential pillar of the circular economy that significantly contributes to promoting economic and ecological resilience. By reducing dependence on new resources, diminishing waste, improving resource efficiency, and stimulating innovation, the reuse of materials helps create a more sustainable and adaptable economic system in the face of changes and crises. This not only supports sustainable economic development but also contributes to environmental protection and improved quality of life for

all. Below, we will outline several ways in which reuse supports resilience, also mentioning some business examples. Thus, reducing dependence on new resources, diminishing waste, improving resource efficiency, creating new economic opportunities, and increasing economic independence are just a few ways in which the reuse of materials supports resilience. It is also important to mention that there are ways through which material reuse contributes to adaptability in the face of unforeseen events, especially when such a force majeure clause is not included in contracts, which would simplify things.

Supply chains that integrate the reuse of materials are more flexible and resilient to disruptions. During a crisis, such as a pandemic or a natural disaster, the ability to use secondary materials already available locally can reduce dependence on affected international shipments. This allows companies to continue operations and fulfill their contractual obligations. In the context of unforeseen events that may increase the costs of new materials, the reuse of materials can be an economically efficient solution. The reduced costs associated with reused materials allow companies to maintain profitability even in adverse economic conditions. This ensures business continuity and economic stability, minimizing the risk of contract non-performance.

The reuse of materials encourages innovation and rapid adaptation to market changes. Businesses that specialize in reuse are often more open to technological innovations and efficient processes. In the face of an unforeseen event, these companies can quickly adjust production processes to utilize available materials, thus ensuring continuity and adaptability. Incorporating sustainability principles through material reuse not only improves resilience in the face of unforeseen events but also contributes to long-term sustainability goals. This creates a competitive advantage for companies that promote eco-friendly practices, attracting environmentally conscious consumers and business partners.

For a better understanding, we will refer to some best practices in the textile industry. Companies like Patagonia and H&M have implemented recycling and reuse programs for old clothes, thus reducing dependence on raw materials and creating more resilient supply chains. The auto industry is also making strides, with manufacturers like Toyota using recycled components in the production of new vehicles, reducing costs and vulnerability to material supply disruptions. The technology industry, which is continuously growing and developing, has introduced recycling programs for electronic components, using recovered materials in the production of new devices, helping manage fluctuations in the supply of rare metals, as exemplified by Apple.

Therefore, the reuse of materials plays a crucial role in increasing the adaptability and resilience of the circular economy in the face of unforeseen events. By reducing dependence on primary resources, flexibilizing supply chains, maintaining low costs, promoting innovation, and supporting

sustainability, companies can navigate crises more efficiently and ensure contractual continuity. We conclude that the reuse of materials becomes an essential strategy for coping with uncertainties and ensuring long-term sustainability.

7. EVALUATING LEGAL ADAPTATION STRATEGIES FOR UNFORESEEN EVENTS IN THE CIRCULAR ECONOMY

A justificatory impediment is a legal concept used to describe situations where a party to a contract cannot fulfill their obligations due to unforeseen and uncontrollable events. This is closely related to force majeure clauses in contracts, which allow for the temporary suspension of contractual obligations in cases of unforeseeable external events such as natural disasters, wars, pandemics, or other extreme circumstances (Plotnic and Popescu, 2022). On the other hand, the circular economy promotes resource reuse, waste reduction, and the creation of a sustainable economic system. In this context, the justificatory impediment plays a crucial role in ensuring the continuity of supply chains and circular economic processes in the face of unforeseen events (Jaffa, 2023).

In recent years, Moldova has made rapid strides towards becoming a greener and more environmentally friendly country, with recent legal strategies confirming this progress. The first "green" economy promotion program in Moldova was implemented from 2018-2020, supporting the implementation of green economy principles in the country and achieving notable accomplishments. However, the challenges and objectives mentioned in Government Decision no. 160/2018 remain unmet, leading to the initiation of a new program (2024-2028) with three general objectives:

- Objective 1: Strengthening the policy and institutional framework to promote green and circular economy principles.
- Objective 2: Accelerating the transition towards green and circular economic development to achieve the goals of the European Green Deal.
- Objective 3: Promoting awareness, education, and understanding in the field of green and circular economy (EU4Environment, 2024).

According to the draft National Regional Development Strategy of Moldova (SNDR) 2022-2028, the results of SNDR 2016-2020 reveal that the main shortcomings relate to the sustainability of economic development. Of the 59 projects approved for funding, including 29 in water and sanitation, 1 in solid waste management, 12 in road infrastructure, and 17 in public building energy efficiency (Popa, 2022).

A good strategy for promoting the circular economy is exemplified by BMW Moldova. On their official website, they emphasize the importance of sustainability, mentioning that resource conservation is one of their core objectives, as is the careful, frequent, and prolonged use of raw materials. They base their approach on three principles and provide some statistics: on average, a

new BMW Group car contains 60 kg of recycled plastic, accounting for at least 20%. Waste processing: BMW Group recycled 99% of the waste generated during the production of 2.3 million cars in 2022—93.4% material and 5.8% thermal. Recycling ratio: 30% of their new cars contain secondary raw materials, i.e., recycled and reused materials (BMW, 2024).

The development of the circular economy in the Republic of Moldova has made significant progress recently due to government efforts, private sector initiatives, and international support. The Green Economy Promotion Program (2018-2020), mentioned earlier, was the first policy document that supported the implementation of green economy principles in Moldova and achieved positive results (Panurco, 2021). Another important step was the adoption of the National Development Strategy "Moldova 2030", which includes objectives for sustainable development and the circular economy, emphasizing efficient resource management and reducing environmental impact, as in Government Decision no. 12/2021(Government of the Republic of Moldova, 2021). Moldova benefits from financial and technical support from the European Union and other international organizations for implementing circular economy projects. In 2022, a new legislative initiative was voted to approve the National Regional Development Strategy of the Republic of Moldova 2022-2028.

The government has begun updating regulations on waste management and recycling to align local practices with European standards. We also observe the introduction of fiscal incentives and subsidies for companies adopting circular economy practices, helping to encourage the transition to a more sustainable economic model. In conclusion, Moldova has made significant progress toward developing a circular economy, but there are still many challenges to overcome. By continuing to implement national strategies, international collaboration, and the active involvement of all stakeholders, Moldova can advance towards a more sustainable and resilient economic model. (Nuganov, 2022).

Given that the European Union strongly supports Moldova in this journey towards a green economy, it is logical that Moldova looks to the EU for guidance and draws on many projects and strategies in this regard. In recent years, there have been some progress toward circularity. For example, Europe has increased recycling rates and promoted shared economy models, such as car-sharing. With a circularity rate of 11.5% in 2022, Europe consumes a higher proportion of recycled materials than other regions of the world. However, progress in the EU has been slow, and we are still far from the ambition to double the Union's circularity rate by 2030 (European Environment Agency, 2024).

The EU has been seriously pursuing a transition to a circular economy since the launch of the first EU Circular Economy Action Plan in 2015. In March 2020, the European Commission adopted a new Circular Economy Action Plan (CEAP), one of the main pillars of the European Green Deal, Europe's new

growth agenda for sustainability. The EU's transition to a circular economy will reduce pressure on natural resources and create sustainable growth and jobs. It is also a prerequisite for achieving the EU's climate neutrality target by 2050 and stopping biodiversity loss (United Nations, 2023).

The European Union has adopted several strategies and regulations to support the transition to a circular economy. These include the Circular Economy Package, the Waste Framework Directive, and the European Strategy for Plastics, which set clear targets for waste reduction and increased recycling. Concurrently, Moldova has begun taking important steps in this direction, adopting national policies aimed at aligning the country with European standards, which makes us optimistic and hopeful for positive forecasts moving forward.

However, implementing a circular economy is not without challenges, especially in the context of unforeseen events that can affect supply chains and contractual obligations. In this regard, the glass industry in Europe offers a relevant case study. The "Close the Glass Loop" program is an example of best practices in applying circular economy principles, while the use of the force majeure clause in this industry illustrates how companies adapt to justificatory impediments in contracts. Now that we have explored the legislation and policies at both the European and national levels regarding the circular economy, I propose analyzing a case study of the glass industry, which highlights how these regulations and initiatives contribute to increased economic resilience and adaptability.

The glass industry in Europe is a remarkable example of applying circular economy principles. The "Close the Glass Loop" program is a pan-European initiative aimed at increasing the glass collection rate and ensuring efficient recycling. This program brings together local authorities, recyclers, producers, and consumers to close the glass lifecycle loop. "Close the Glass Loop" aims to raise the glass collection rate to 90% by 2030. By improving collection infrastructure, educating consumers, and optimizing recycling processes, the program contributes to reducing glass waste and reusing this valuable resource. The average collection and recycling rate of glass packaging in the EU and the UK reached a record 80.2% in 2024, maintaining the same level as the previous year, according to the latest data from the Close the Glass Loop platform (The European Container Glass Federation, 2024). In 2023, recycling glass prevented approximately 12 million tons of glass waste from being landfilled (Vetrotime, 2023).

In the context of the COVID-19 pandemic and the Russo-Ukrainian war, the glass industry, like many others, faced significant supply chain and operational disruptions. Many companies in the sector invoked the force majeure clause to justify the temporary non-performance of contractual obligations. The force majeure clause refers to unforeseeable and unavoidable events that prevent

contractual parties from fulfilling their obligations (Amarița, 2006). During the pandemic, lockdown measures, factory closures, and transport restrictions were considered force majeure events. At the pandemic's peak, many recycling and raw material supply contracts were affected. Glass recycling companies encountered difficulties in collecting used glass, and production factories had problems with a constant supply of recycled raw materials. Glass recycling contributed to reducing CO2 emissions by approximately 7 million tons in 2022, equivalent to the emissions generated by 2 million cars per year (Akhalkatsi *et al.,* 2021).

To manage risks and ensure operational continuity, companies included adaptability clauses in contracts. These clauses allowed for the renegotiation of contractual terms based on unforeseen circumstances, ensuring a certain level of flexibility and resilience. In the face of the crisis, glass industry companies intensified collaboration with local authorities and business partners. At the peak of the pandemic, the temporary closure of collection and recycling facilities led to a decrease of about 15% in the volume of glass collected in some regions. Glass industry companies invoked the force majeure clause to temporarily suspend contractual obligations, allowing for renegotiation of terms and ensuring the continuity of partnerships. About 20% of companies in the sector reported using the force majeure clause during 2020-2021.

The program supported the adoption of new technologies to optimize recycling processes. For example, the use of optical sorting technology increased recycling efficiency by 25%, reducing contamination of recycled materials (NGA, 2024). Through public-private partnerships, temporary solutions were developed for managing glass collection and recycling, ensuring the continuity of economic processes. The pandemic and the critical situation in Ukraine accelerated the adoption of innovative technologies in the glass industry. Automating recycling processes, using artificial intelligence to optimize the supply chain, and digitizing operations contributed to increased resilience and rapid adaptation to new conditions.

The case study of the "Close the Glass Loop" program and the use of the force majeure clause in the glass industry demonstrate how the circular economy can contribute to resilience and adaptability in the face of unforeseen events. By adopting flexible strategies, collaboration, and technological innovation, companies can overcome challenges and continue to promote sustainability and the circular economy. This approach not only minimizes the negative impact of crises but also creates a more robust and sustainable economic model for the future. Concrete statistical data highlight the positive impact of the initiative despite the challenges imposed by the COVID-19 pandemic. Through adaptive strategies and extended collaborations, the program continues to promote sustainability and innovation in the glass industry.

8. CONCLUSION

Circular economy represents a central pillar in sustainable development, promoting resource reuse and waste reduction, with legislation playing a crucial role by providing the necessary framework for adopting circular practices. At the European level, regulations such as the Circular Economy Package and the Waste Framework Directive set clear objectives for waste reduction and increased recycling, significantly contributing to environmental protection and economic development.

Concurrently, Moldova has adopted policies like the Green Economy Promotion Program and the National Development Strategy "Moldova 2030," supporting the transition to a circular economy, leading to notable changes both nationally and internationally over the past five years. However, recent years have witnessed numerous uncertainties, highlighting the essential role of managing risks and unforeseen events for the success of the circular economy. Events like the COVID-19 pandemic have exposed vulnerabilities in supply chains, emphasizing the need for adaptive legal strategies.

To more effectively integrate resilience and material reuse concepts into existing legislation, several improvements are necessary. Introducing adaptability clauses in contracts would enable renegotiation based on unforeseen circumstances. Policies should encourage investments in innovative technologies and promote public-private partnerships for developing common solutions. Public education campaigns on the benefits of the circular economy and the importance of recycling need intensification to support the transition to a sustainable economic model. Examples of effective policies and programs implemented in various countries demonstrate the efficacy of these measures. Germany has adopted stringent waste recycling legislation, Italy launched the "RiVetro" program to increase glass collection rates, and the Netherlands implemented a deposit system for glass and plastic packaging. These initiatives illustrate that, through flexible strategies and extensive collaboration, we can build a robust and sustainable economic model capable of adapting swiftly to future changes and crises.

A case study like the "Close the Glass Loop" program in the glass industry exemplifies how the circular economy can enhance resilience against unforeseen events. By increasing glass collection and recycling rates and adopting innovative technologies, the program maintained economic processes and underscored the importance of collaboration among local authorities, recyclers, and manufacturers. Despite pandemic challenges, the initiative succeeded in reducing waste, saving energy, and lowering CO2 emissions.

In conclusion, integrating resilience and material reuse into the circular economy is essential for addressing unforeseen events and ensuring long-term sustainability. Through the adoption of flexible strategies, support for

innovation, and expanded collaboration, we can construct a resilient economic model capable of thriving in the face of future challenges.

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