ENHANCING STATE SUPPORT FOR LATVIAN BIOECONOMY ENTERPRISES: CHALLENGES AND OPPORTUNITIES

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Abstract
The bioeconomy plays a vital role in achieving sustainability goals as an integral part of the European Green Deal. However, transitioning to bioeconomy-driven business models can require significant investments, such as introducing advanced technologies and workforce training, which can pose challenges for small rural enterprises. The aim of this study is to identify the obstacles that Latvian entrepreneurs face when transforming their businesses in alignment with the Green Deal and to assess existing opportunities for state support, ultimately providing recommendations for improvement. The study assesses the European Union and Latvian regulatory frameworks in light of the opportunities presented by the Bioeconomy and Green Deal strategies, with a focus on objectives, outcomes, and support measures. The survey data of existing and future entrepreneurs were statistically analyzed using the SPSS program, which involved central trends and location measures, a T-test, and factor analysis. The findings reveal that although Latvia has updated its regulatory framework to promote the Green Deal, the available state support is insufficient to facilitate enterprises' transition to bioeconomic activities. The surveyed entrepreneurs emphasize the need for enhanced financial support, including funding for advanced technologies, subsidies, and grants to help offset transformation costs. To enhance state support, it is crucial to harmonize policies and implement regulatory adjustments that promote sustainable business development in Latvia's rural regions. Strengthening these measures will enable small enterprises to successfully transition to the bioeconomy, contributing to broader sustainability and economic resilience goals.
Keywords: bioeconomy, enterprises, European Union Green Deal, state support, sustainability.

Introduction

The Small Business Act for Europe, adopted in 2008, emphasizes the diversity of small and medium-sized enterprises. According to the basic principles of this act, state support for enterprises should be tailored to their specific needs and characteristics. Following principle 9 of the Act, Member States should enable SMEs to turn environmental challenges into opportunities. Thus, this principle indirectly indicates the need for state support, for example, by transforming the business model in line with the European Union's Green Deal (GD). Following the practical implementation of the principles of this Act in the Member States, the EC has recognized that access to finance for enterprises remains a challenge despite the measures taken. However, the ambitious European Union (EU) plans for economic development and recovery do not include specific measures specifically to support enterprises, leaving their determination to each Member State.

Moreover, as digital tools evolve, the significance of associated risks becomes increasingly acknowledged by bioeconomy enterprises (Zeverte-Rivza et al., 2024).

Several research studies have found that government subsidies to enterprises, including those supporting green innovation, are effective in easing financing constraints for businesses (e.g., Chen et al., 2024). However, European entrepreneurs often lack state support or incentives that would promote the implementation of bioeconomy principles or efforts to seek business alternatives to bioresources, thereby creating more excellent added value (Dietz et al., 2018; Salvador et al., 2022).

The EU offers support to the Member States to promote the bioeconomy. There are different understandings of what the bioeconomy is and how to promote it in the national economy. The extent to which support measures ensure the growth of a sustainable bioeconomy depends on how well the national bioeconomy strategy is designed (Dietz et al., 2018). There are also different views on the areas or sectors of the bioeconomy. Consequently, the classification of business types or sectors depends on the direction of bioeconomic development accepted in the country, which is outlined in the relevant national strategies. Thus, the framework for promoting the bioeconomy also differs (Dietz et al., 2018).

The concept of the bioeconomy, introduced by the European Commission in 2018, relates to the transition from fossil resources to bioresources. Gradually, areas that apply circular economy principles are being introduced into the bioeconomy, emphasizing innovation and substitute products, using sustainable business processes and services, integrating knowledge from biotechnology, and producing healthy food. Along with improving sustainability practices, the boundaries between bioeconomy industries are also blurring (Salvador et al., 2022).

In Latvia, the bioeconomy refers to those industries within the national economy that utilize bioresources to produce food and feed, energy, goods, and services, as well as the primary production of bioresources and their subsequent processing.

The aim of this study is to identify the obstacles that Latvian entrepreneurs face when transforming their businesses in alignment with the GD and to assess existing opportunities for state support, ultimately providing recommendations for improvement.

Materials and Methods

To achieve the overarching aim of the research, desk research was conducted, involving an in-depth

qualitative analysis of literature sources and EU and Latvian policy documents regarding potential support for businesses operating in the bioeconomy and the Green Deal. The primary EU and Latvian policy documents reviewed are as follows:

1) EU Bioeconomy Strategy (adopted in 2018);
2) EU Green Deal Strategy (adopted in 2019);
3) EU Common Agricultural Policy 2023-2027 (adopted in 2021);
4) Latvian National Bioeconomy Strategy (adopted in 2017);
5) Latvia's Climate Neutrality Strategy by 2050 (approved in 2020);
6) Latvian Common Agricultural Policy Strategic Plan 2023-2027 (adopted in 2022).

The research has found that the objectives, achievable tasks, and measures of the EU Bioeconomy Strategy are included in the EU GD framework (Liobikienė & Miceikienė, 2023).

To continue the research, a questionnaire was developed and distributed among existing and potential entrepreneurs to gauge their awareness and attitude toward the GD in Latvia. The survey aimed to determine the respondents' understanding of the changes to be introduced in business activities, based on whether they had business experience in implementing the GD.

The survey included 10 questions regarding the respondents' awareness of applying the GD requirements in business, the strategies included in the GD concept, and other aspects. The survey received 174 valid responses. The present research presents part of a broader assessment that reveals the challenges identified by the respondents and their views on how the implementation of the GD could affect their future activities, depending on the sector. It also indicates the desired state support measures. It examines whether the financial needs of companies align with those outlined in EU and Latvian policy documents promoting the bioeconomy.

Results and Discussion

It is highlighted that there are still challenges regarding the framework for supporting the effective transformation of business models into bioeconomy ones. Entrepreneurs must make significant investments to adapt their economic activities to meet new environmental standards and expectations (Salvador et al., 2022).

When assessing EU policy documents, it has been found that the EU's planned direction, which promotes economic development and support measures, is geared towards achieving the United Nations climate neutrality goals. It is worth noting that the EU Bioeconomy Strategy and the GD are aligned to promote sustainability, reduce environmental impact, and drive economic growth through the sustainable use of bio-based resources and the implementation of circular economy principles. The European Bioeconomy Strategy and the GD are interconnected with various EU policies, including the Common Agricultural Policy (CAP), the Farm to Fork Strategy, and the Biodiversity Strategy. This integration ensures a cohesive approach to achieving sustainability and environmental goals across various industries. However, the Bioeconomy Strategy focuses more on bio-based resources and related sectors. At the same time, the GD provides a comprehensive framework for transforming the entire EU economy toward sustainability and climate neutrality (Liobikienė & Miceikienė, 2023). While EU public support is included in both the Bioeconomy Strategy and the GD to promote sustainable transitions through financial support and regulatory frameworks, each strategy also includes individual measures tailored to its specific objectives and sectoral focus.

The EU has introduced several state support measures specifically designed to assist small and new businesses in rural areas, thereby facilitating their alignment with the objectives of the EU Bioeconomy Strategy and the European Green Deal (Table 1). This is particularly evident when providing financial measures for a sustainable transition. However, each strategy includes measures tailored to their specific objectives and support focus. Consequently, the state support for investment outlined in the EU's multiannual financial framework sometimes overlaps with subordinate policy documents.

Latvia is one of the few EU Member States to have developed a National Bioeconomy Strategy. It includes specific objectives and measures to support the transition to a bioeconomy with a focus on sustainable agriculture, forestry, waste management, bioenergy production, and biotechnology research. In Latvia, the Bioeconomy Strategy was adopted in 2017, prior to the development of the EU's Green Deal strategy, which in turn promotes the development of the bioeconomy in the EU.

Latvia's Climate Neutrality Strategy, approved in 2020, is a long-term policy document that serves as a basis for policymakers to implement approaches outlined in the EU Green Deal Strategy, including the development of the bioeconomy. The Climate Neutrality Strategy supports measures that promote the development and implementation of climate technology innovations in Latvia. Although these technological solutions are primarily aimed at reducing direct greenhouse gas (GHG) emissions in energy, transportation, agriculture, waste management, and industrial processes, they directly or indirectly affect almost any company in its green transformation of business activities. It is also essential to focus on business management capacity-building skills to bring the green transformation to life (Salvador et al., 2022). It is recognized (Bröring & Vanacker, 2022; Salvador et al., 2022) that companies from various industries may be involved in the bioeconomy production process or chain.

Table 1

Comparison of European Green Deal and Bioeconomy business support measures

Similarities	***Differences***
1. Both strategies benefit from overarching frameworks that streamline state support processes and promote sustainable investments.	1. The Bioeconomy Strategy places a strong emphasis on research and innovation specific to bio-based industries, with earmarked funding to develop sustainable biological resources.
2. Financial instruments and regulatory adjustments are employed in both strategies to encourage innovation and the adoption of sustainable practices across various industries.	2. The GD encompasses a broader range of initiatives, including industrial decarbonization, energy transition, and infrastructure development, with tailored state support measures for industries such as steel manufacturing and clean technology production.
3. The EU CAP is a primary instrument for supporting rural development across the EU. It provides funding and actions aimed at enhancing the vibrancy and economic viability of rural areas, thereby reinforcing their social, environmental, and economic sustainability.	3. The EU's Bioeconomy Strategy includes launching a Strategic Deployment Agenda for Sustainable Food and Farming Systems, which aims to promote sustainable food and farming systems, forestry, and bio-based products. This initiative supports the rapid deployment of local economies across Europe, with a focus on rural areas.
4. As part of the GD, the EU has established the Social Climate Fund to support vulnerable residents and small businesses in the green transition. This fund allocates investments to assist those most affected by energy or mobility poverty, ensuring equitable opportunities in the shift toward sustainability.	4. The GD emphasizes environmental goals and supports small and medium-sized farms, young farmers, and gender balance in agriculture. This support is part of the broader reforms aimed at achieving the GD's objectives.
5. Both strategies support job creation. The bioeconomy is expected to generate numerous green jobs, particularly in rural and coastal regions. The GD also seeks to stimulate economic activity through green investments and sustainable innovation.	5. The Bioeconomy Strategy promotes education and skills in the bioeconomy. It emphasizes research and innovation to drive the sustainable use of biological resources.
	6. The GD provides a wide range of public and private investments to support the green transition.

Consequently, they may face similar barriers, challenges, drivers, and opportunities as companies traditionally focused on bioeconomy industries (Table 2). Therefore, our research study does not focus on the specific needs of individual industries.

Table 2

Key challenges and opportunities for companies in the development of the bioeconomy (based on: Bröring & Vanacker, 2022; Salvador et al., 2022; Thomchick et al., 2024)

Challenges	***Opportunities***
1. Lack of financial resources to move towards more circular practices and difficulties related to logistics	1. State subsidies, financial incentives, and investments
2. Lack of appropriate technology	2. Development of or access to technology
3. Lack of knowledge and specific skills	3. Opportunity to optimize commercial operations while increasing the company's value
4. Lack of awareness and inadequate policy/regulation	4. Opportunities to penetrate new market segments and expand the use of bio-based raw materials, products, and services
5. Lack of or insufficient government support to overcome various obstacles to business transformation	

The survey results demonstrated that significant upfront investments often hampered the transition to sustainable and bioeconomy-friendly business models in technology, infrastructure, and training. This can be a severe financial burden, especially for small businesses.

The survey identified the respondents' opinions: 'In which sectors in Latvia, in your opinion, should measures be implemented to reduce GHG emissions?' The statistical analysis presented includes Levene's test for Equality of Variances and t-tests for Equality of Means across various economic sectors (Table 3).

The Levene's Test was used to determine whether variances were equal across the groups. Significant variance differences were found for 'Waste Management' ($p = 0.001$), 'Trade' ($p = 0.001$), and 'Other' ($p = 0.000$), requiring interpretation using the unequal variances t-test. While most sectors showed no significant differences in means, the 'Trade' sector indicated areas where further investigation might be needed. The results for 'Waste Management' and 'Trade' should be interpreted cautiously due to variance differences.

The 'T-test for Equality of Means' showed that the 'Trade' sector was marginally significant ($p = 0.057$ with equal variances, $p = 0.062$ without equal variances). However, due to the objectives set, in terms of potential impacts, the waste management sector will likely be more affected by the GD requirements than the trade sector.

All other sectors (Construction, Energy, Agriculture, Forestry, Industry, Transport, and Food Production) had non-significant results ($p > 0.05$), indicating no firm evidence of mean differences between the groups.

Table 3

Levene's Test for Equality of Variances and t-tests for Equality of Means across various economic sectors

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Waste management	Equal variances assumed	12.153	**0.001**	1.693	169	0.092	0.028	0.017	-0.005	0.061
	Equal variances not assumed			1.424	70.000	0.159	0.028	0.020	-0.011	0.068
Construction	Equal variances assumed	0.839	0.177	-0.709	174	0.479	-0.052	0.074	-0.198	0.093
	Equal variances not assumed			-0.705	149.515	0.482	-0.052	0.074	-0.199	0.094
Energy	Equal variances assumed	5.443	0.021	-1.138	174	0.257	-0.084	0.074	-0.231	0.062
	Equal variances not assumed			-1.149	157.505	0.252	-0.084	0.073	-0.230	0.061
Agriculture	Equal variances assumed	0.182	0.670	-0.210	174	0.834	-0.016	0.076	-0.166	0.134
	Equal variances not assumed			-0.210	153.114	0.834	-0.016	0.076	-0.167	0.135
Forestry	Equal variances assumed	2.024	0.157	-0.696	174	0.487	-0.052	0.075	-0.201	0.096
	Equal variances not assumed			-0.699	155.052	0.485	-0.052	0.075	-0.200	0.096
Industry	Equal variances assumed	0.212	0.645	0.232	174	0.817	0.015	0.065	-0.113	0.142
	Equal variances not assumed			0.230	150.337	0.818	0.015	0.065	-0.113	0.143

Trade	Equal variances assumed	11.392	**0.001**	-1.913	174	0.057	-0.138	0.072	-0.280	**0.004**
	Equal variances not assumed			-1.880	143.013	0.062	-0.138	0.073	-0.283	0.007
Transport	Equal variances assumed	2.256	0.135	-0.738	174	0.461	-0.045	0.061	-0.165	0.075
	Equal variances not assumed			-0.750	161.102	0.454	-0.045	0.060	-0.163	0.073
Food production	Equal variances assumed	0.226	0.635	0.236	174	0.814	0.017	0.072	-0.126	0.160
	Equal variances not assumed			0.236	153.934	0.813	0.017	0.072	-0.126	0.160

Table 4 presents the distribution of answers given by respondents with and without business experience. In their opinion, the GD's requirements for reducing GHG emissions are most applicable to waste sorting, industry, and transportation. This indicates a general understanding among current and future entrepreneurs that the requirement to achieve GHG affects most industries.

The t-test revealed no significant differences between respondents with and without experience in business management. The total responses should be counted; however, we performed a cross-tabulation analysis for a more detailed examination of the results.

Table 4

Distribution of the responses by the respondents with and without business experience regarding GHG emission measure impact on industry

	Waste Management	Construction	Energy	Agriculture	Forestry	Industry	Trade	Transport	Food production
Experience	44	23	30	26	17	42	12	49	17
No experience	69	42	45	43	23	75	22	69	39
Not indicated	0	1	1	2	0	2	0	3	0
Total	**113**	**66**	**76**	**71**	**40**	**119**	**34**	**121**	**56**

The survey identified the respondents' opinions on: 'How, in your opinion, will the introduction of the GD requirements affect the operation and performance of Latvian micro, small, and medium enterprises?'. The statistical analysis included Levene's test for Equality of Variances and t-tests for Equality of means to assess the impact of implementing the GD requirements on business performance. None of the tests for differences in means across the measures, except one, reached statistical significance ($p > 0.05$ for all others). Although some variables, such as 'The company's competitiveness will increase', had p-values closer to 0.05 ($p = 0.092$). The overall findings suggested that there were no significant differences between the two groups for any of the tested perceptions regarding increases or decreases in revenue, expenses, productivity, or competitiveness. An analysis of the number of responses regarding the potential impact of introducing GD requirements among respondents with and without business experience (Table 5) revealed that the majority indicated that business performance expenses might increase. This suggests that one factor contributing to increased competitiveness may be the rising costs associated with the transformation process.

In addition, the survey asked what support measures would help Latvian enterprises to transform or adapt their operations in line with the GD.

The survey results showed that entrepreneurship requires diverse support Figure 1.

Most respondents indicated that they would need state support to obtain financing, subsidies, grants, and employee training. Many found 'green' business best practices applicable, as well as improving digital skills.

The Latvian Common Agricultural Policy Strategic Plan for 2023-2027 envisions balanced state support to achieve national and EU climate objectives, targeting different audiences with a particular emphasis on small and new rural entrepreneurs, as well as organic farmers. Support for rural enterprises in the coming years is intended to:

a) increase value added by cooperating and producing competitive products for the local and export markets;

b) increase farm incomes to the average in the country;
c) promote knowledge-based entrepreneurship by fostering innovation and the implementation of scientific research findings in practice;
d) support farms in effectively using resources and adapting to climate change.

In Latvia, business-focused bank support is problematic from the OECD's perspective in the 2024 review. Financial institutions are avoiding the risk associated with the uncertainty created by the GD.

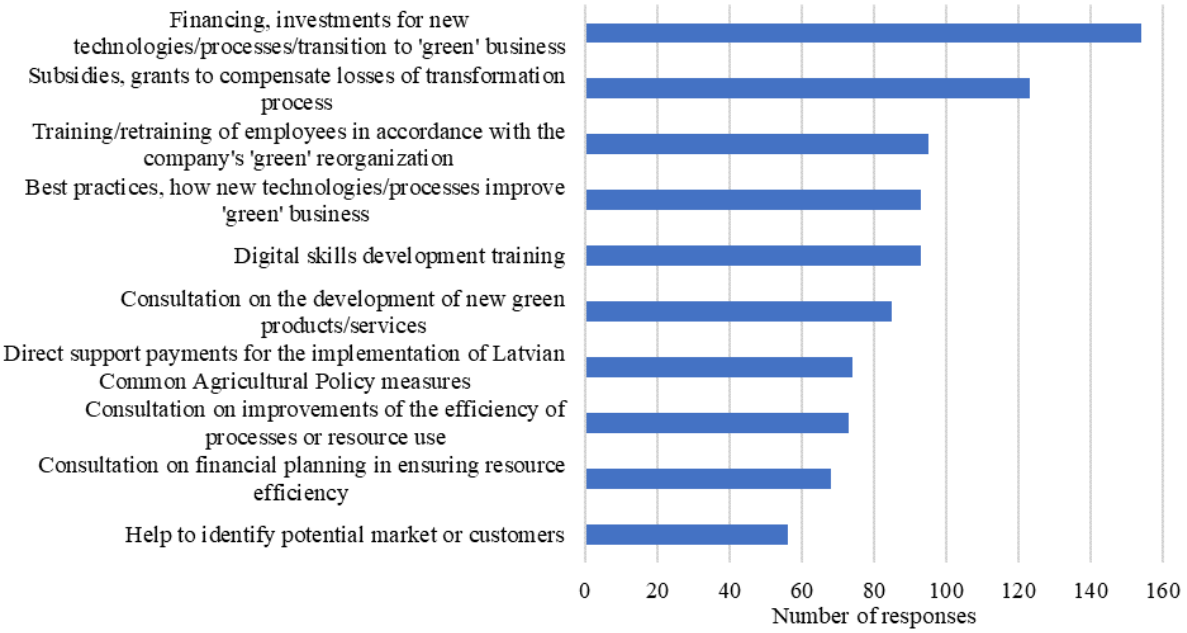
Table 5

Distribution of the responses by the respondents with and without business experience regarding the impact of the implementation of the Green Deal requirements on entrepreneurship

Impact of GD requirements	***Experience***	***No experience***	***Not indicated***	***Total***
revenue will increase	12	13	0	**25**
expenses will increase	43	75	2	**120**
productivity will increase	23	23	0	**46**
company's competitiveness will increase	28	50	0	**78**
other impact	3	1	0	**4**
revenue will decrease	17	26	1	**44**
expenses will decrease	3	8	0	**11**
productivity will decrease	12	15	0	**27**
company's competitiveness will decrease	13	9	0	**22**

Figure 1

Responses on state support within the framework of the European Union's Green Deal (n=174)



Although the OECD does not focus on specific policy strategies, its recommendations can also be applied to support the GD and the bioeconomy. The OECD notes that in Latvia, numerous small-scale programs exist with varying application procedures and requirements. Several ministries and agencies assume support functions. Consequently, comprehensive, centralized, and focused support is lacking. Support policies, in general, should be improved, including an impact assessment of support use. Based on the evaluation, the supply of support programmes should be expanded, and the efficiency of their use should be improved. It is true not only for Latvia, but there is also lack of systematic empirical analysis of how environmental policy promotes the transformation of high-quality green enterprises and the impact that financial constraints may have (Chen et al., 2024). Recognizing that policies and politics are essential elements of sustainability transitions, the authors draw attention to synergies between policy regulation and control instruments (Thomchick et al., 2024). Some authors (Dietz et al., 2018) believe that the primary challenge in developing a sustainable bioeconomy is to establish governance policies that effectively support its growth. These support measures can include research and development strategies, enhancing the competiti-

veness of organic products through subsidies, and implementing awareness-raising campaigns in society to promote more responsible and sustainable consumption. The bioeconomy encompasses a diverse range of stakeholders, including government institutions, industries, manufacturing companies, environmental organizations, and civil society. Developing and improving a thriving bioeconomy depends on the successful involvement and coordinated action of all stakeholders (Thomchick et al., 2024).

Analyzing the factors influencing the transition to bioeconomy, some authors (Zihare et al., 2021) emphasize that for a practical policy framework, it is essential to support the development and implementation of innovations, new technologies, and production methods. In Latvia, compared to other countries, the number of biotechnology companies, including those involved in environmental, industrial, and agricultural biotechnology, is low. The authors recommend establishing a three-fold connection for the successful transition to a bioeconomy in policy, research, innovation, and technology.

Overall, while the EU Bioeconomy Strategy and the European Green Deal offer significant opportunities for business development through sustainable practices and economic diversification, they also pose challenges in terms of implementation costs, regulatory compliance, and market adaptation. Addressing these challenges requires concerted efforts, including financial support and advisory assistance, to enable businesses to transition effectively to the bioeconomy.

Conclusions

1. When creating an effective state support policy, the priority should be based on the locally identified challenges that most entrepreneurs face. Entrepreneurs require a range of support tailored to the unique needs of their industry.
2. Companies that envisage introducing bio-innovative processes and technologies, promoting the development of new 'green' products and services, and attracting new markets should receive focused support.
3. Developing successful bioeconomic support policies requires the involvement of stakeholders, including public authorities, industries, manufacturing companies, environmental organizations, and civil society.

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