Digital innovation and circular economy ecosystems analysis

Interreg Europe

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CEI BOOST – Boosting Circular Economy Innovation through emerging technologies application

The CEI BOOST – Boosting Circular Economy Innovation through emerging technologies application project aims to increase the use of digital innovations to support the circular economy. The goal is to enhance the development and implementation of sustainable digital solutions in the circular economy, especially in relation to new technologies, and to ensure that the solutions are used to accelerate the transition to a sustainable circular economy. The countries participating in the project are Bulgaria, Finland, France, Greece, Lithuania, Portugal, Romania, Spain and Sweden.

Digitalization is a wide spectrum, and most people and companies use digital solutions to some extent. However, the degree of use and purpose varies. Digitalization should be looked at as a whole, when e.g., developing the level of digitalization in the businesses. It would also be beneficial to have a strategic approach.

Common everyday solutions which combine circular economy and digitalization we use are applications and platforms. We have city bikes, online flea markets and apps to purchase surplus lunch. On the bigger scale, our waste goes through a massive waste separation plant, that separates recyclable items from the waste stream with the help of separators, magnets and optical sorters using the state-of-art technology.

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While policymakers are yet to actively link digitalization with wider sustainability efforts when developing policies and financing projects, there is a growing need to align the circular and digital agendas. The Green Deal recognises that circular economy and strong involvement from industry is central to making the EU's economy sustainable.

The CEI Boost project aims at improving policies for easing and speeding up the twin transition to ensure that Green Growth and Digital Transformation go hand in hand to drive regions' recovery and prosperity. The project focuses at enhancing policies conditions in 9 countries for boosting the application of emerging digital innovations to support the growth of circular economy at regional, local or national level, gathering expertise from different regions, different levels' policymakers and leading innovation ecosystems' actors. (CEI Boost 2023)

One of the first activities of the project has been to identify the actors and stakeholders related to both digitalization and the circular economy, and to analyse the current state and maturity of the regions in digitalization and circular economy.

The analyses by the regions highlight potential projects and approaches that have already exploited the potential of digitalization to boost sustainable development and the circular economy in particular.

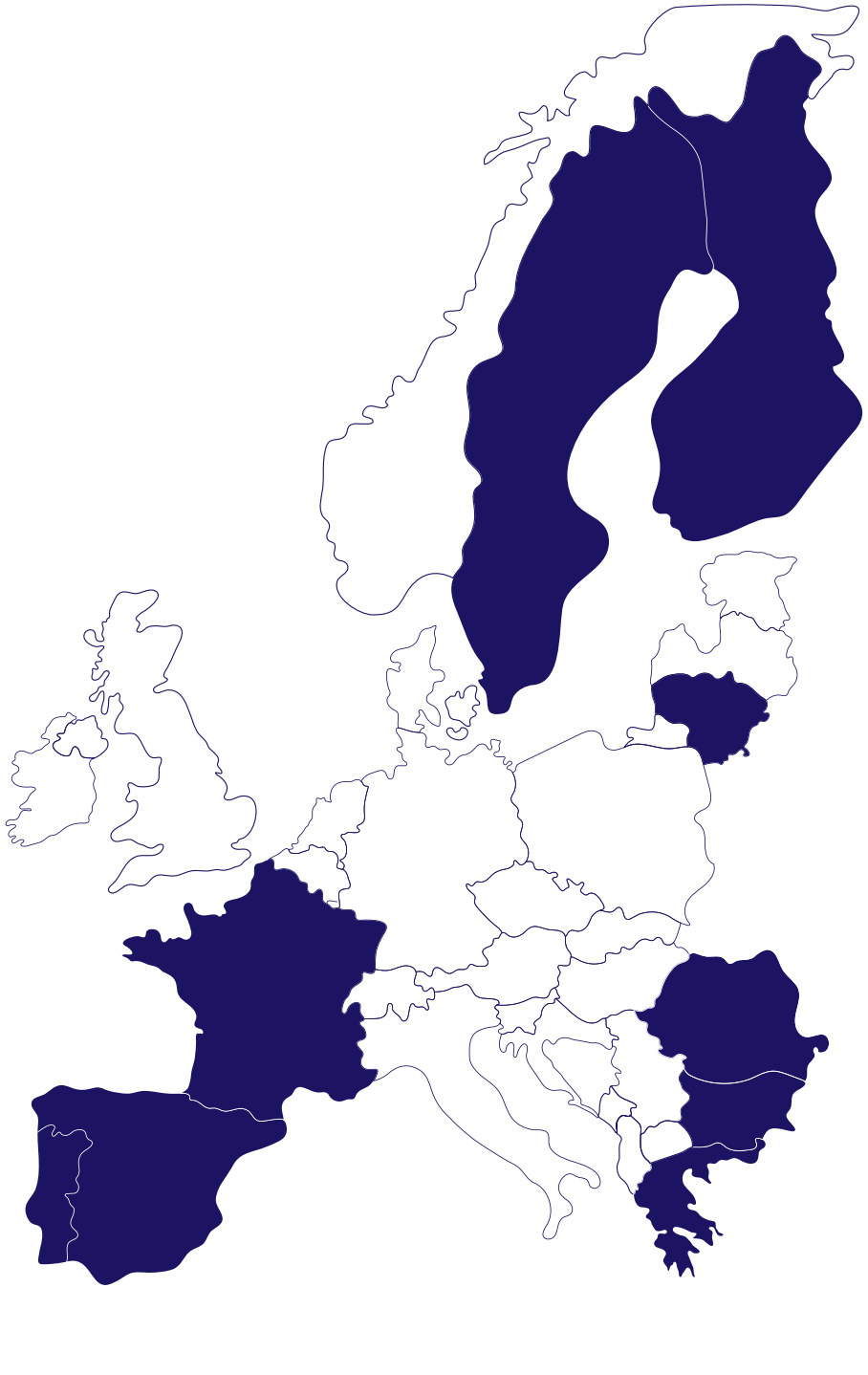
The analysis shows that the level of maturity of the regions in the field of digitalization and circular economy varies, but the general observation is that all the regions included in the analysis have made recent progress and many policies and potential projects are underway and recently initiated. On the other hand, the full potential of digitalization to promote and boost the circular economy has not been exploited.

In conclusion, the analysis carried out confirms the need for policies and development work that uses digitalization in an intelligent, user-driven and justified way to boost the circular economy.

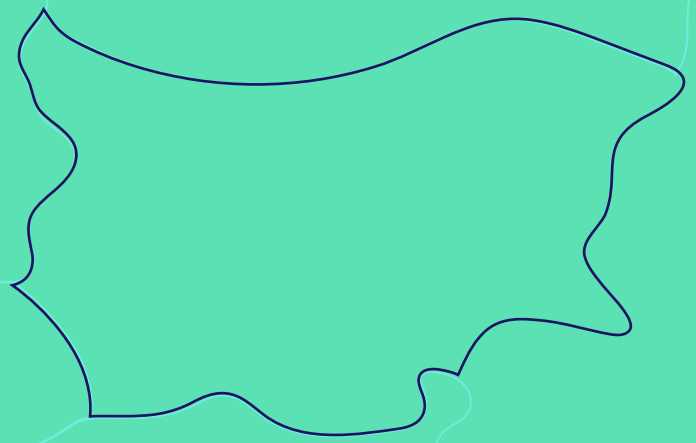
This document analyses the current state of Digital Innovation and Circular Economy in Bulgaria. The analyses of each partner region and more information of the CEI Boost can be found on the project website: *interregeurope.eu/cei-boost*

CEI Boost Partners

Sweden	Region Västerbotten
Finland	Regional Council of Päijät-Häme LAB University of Applied Sciences
Lithuania	Public Institution Lithuanian Innovation Centre Innovation agency
Bulgaria	Business Agency Association
Romania	Institute for Research in Circular Economy and Environment “Ernest Lupan” West Regional Development Agency
Greece	Industrial Systems Institute
Spain	Tarragona Provincial Council
Portugal	Business Development Institute of the Autonomous Region of Madeira
France	Laval Mayenne Technopole



Bulgaria



In recent years, Bulgaria has remained in the club of "modest innovators". The country registered a positive change in terms of its overall performance in the European Innovation Scoreboard (DESI) both in relation to its positions in 2015 (+1.5%) and in relation to 2021 (+3%). However, this is not enough to improve its comparative positions against the background of the overall growth of innovativeness of the European economy by 9.9% and the convergence of the countries from the remaining three groups - "leading", "strong" and "moderate" innovators.

Bulgaria is once again in the penultimate place in the EU. The innovative performance of the country is even weaker compared to that of the candidates for EU membership - North Macedonia, Montenegro and Serbia, despite the fact that they have much more limited access to European structural funding, which Bulgaria mainly relies on for the financing of its science and innovation policy.

Digital innovations and digitalization in Bulgaria

Bulgaria builds its digital transformation on the following strategic documents:

- "Digital transformation of Bulgaria for the period 2020–2030"
- National program "Digital Bulgaria 2025"

60% of enterprises in our country are defined at a low and moderate level of digitization, and only 19% of people in key positions possess the necessary digital skills. At the same time, 38% of those surveyed have only basic digital skills. Bulgaria's economy lags behind in digital transformation. The reasons are mainly that digitization is not a priority at the moment, they have other priorities caused by the economic crisis, the financial situation. Another reason is related to the low level of digital skills of employees. A third reason is that there is a lack of strategy, an overall strategy. Only 20% of these enterprises have a digitalization strategy and any long-term investment plans and intentions in this area.

Bulgaria's vision for achieving a digital transformation of society and the economy in the Strategy foresees measures to realize its goals through the programs for the 2021-2027 program period, co-financed by the EU, namely PKIP, PNIIDIT, HRD and Education. These programs are implemented by Ministry of innovation and growth and Ministry of economy and industry.

PKIP - Program "Competitiveness and Innovations in Enterprises" (PCIP), with which nearly BGN 3 billion will be invested in the Bulgarian economy. The main priorities of the Program are two - "Innovations and Growth" and "Circular Economy". Funds are provided for scientific research and development activities in companies, increasing export potential, creating new or developing companies from the more high-tech sectors of industry, protecting patents, industrial property, etc. Digitization, the increase of cyber security, the confidentiality of data in SMEs and the skills of the staff to work with the technologies of Industry 4.0 will be stimulated. The modernization of family businesses and those in the creative industries and crafts will be supported.

- PNIIDIT - Program "Scientific research, innovation and digitalization for intelligent transformation" (PNIIDIT) meets the strategic needs and priorities of Bulgaria for accelerated economic development through investments in the development of scientific research, scientific infrastructure, innovation and smart industry and the rapid entry of digital technologies in the economy and society. The ambition is for the country to significantly increase its innovation performance and by 2030 to move from a "starter" to a "moderate" innovator.

- Education - The Education Program 2021-2027 (PO) is one of the main tools for implementing priority 1 "Education and skills" of the National Development Program BULGARIA 2030

- HRD - Through the implementation of the Human Resources Development Program, support will be provided for the development of the workforce in Bulgaria and overcoming the challenges facing the labor market.

- NATIONAL RECOVERY AND RESILIENCE PLAN Component 2: DI-GI Skills and Competencies Training – a soecific measure for financing IT projects will provide a total of over 420 million BGN, for services and systems in mechanical engineering and medicine, 3D digitization, Internet of Things, blockchain technologies, cyber security.

Status of circular economy in Bulgaria

Bulgaria has a national Strategy and action plan for the transition to a circular economy of the Republic of Bulgaria for the period 2021-2027.

Bulgaria faces the risk of not achieving the 2025 targets set by the European Union for preparation for the reuse and recycling of municipal waste and for the recycling of packaging waste.

Meeting the 2035 target for municipal waste disposal is also a cause for concern. According to the data, the percentage of municipal waste recycling in our country in 2020 was only 31.5%, while in just a few years - in 2025, this share should already be at least 55%.

Regarding the recycling of all packaging waste, the result achieved in 2020 was significantly better - 61%, and although it is quite close to the set goal of 65% in 2025, the EC warns that here too Bulgaria may fail to meet the target.

The municipal waste disposal rate in our country is 61%, while the goal for 2035 is to be below 10%.

Bulgaria ranks 27th in the EU in terms of circular economy implementation, but is among the top ten countries in the world with the smallest carbon footprint in the food sector.

The country's resource productivity, measured as a ratio of GDP to the amount of natural resources used, is among the lowest in the EU.

The development of innovations, and in particular eco-innovations, is a fundamental part of the concept of achieving a Circular Economy. According to EC and Eurostat data, Bulgaria ranks second to last in the EU in terms of the value of the eco-innovation index.

In terms of waste management, 84.7 million tons of waste were generated in Bulgaria in 2020, which places the country in one of the first places in the European Union in terms of generated waste per capita and GDP unit.

Despite a relatively well-developed recycling industry, the country records low levels of household waste recycling (34.6%) compared to the EU average (47.8%) for 2020.

A serious challenge lies ahead for local authorities – the introduction of mandatory separate collection of bio-waste from households in 2024.

Digitalization & Circular economy

In Bulgaria, in recent years, various organizations have actively promoted the fact that by applying appropriate strategies and technologies in the design, production and delivery of goods, companies have the opportunity to significantly extend the life cycle of goods and repeatedly use the materials and components originally invested.

The answer to how to achieve all this lies in focused digitization and the implementation of innovations that will help to optimize every process from production, through supply chains to the recycling of materials. In the digital circular economy, digital transformation is tasked with supporting better coordination and connection of material and information flows through solutions such as sensors, automated platforms, the Internet of Things or blockchain applications.

Digital technologies can deploy a huge field of resource and process optimizations. Bulgarian companies have high potential in the following four key technologies that support the development of the circular economy in the work of organizations. At the moment, few organizations apply the possibilities of artificial intelligence and blockchain for the purposes of sustainability, but Bulgarian companies working in these areas are developing very quickly.

Blockchain - provides trust and transparency in tracking the origin of products and the resources used for them. The technology underpins the creation of transparent digital supply chains and allows natural resources to be tokenized, giving them a unique digital identity for a new way of valuing and trading them.

Internet of things - data collected by smart devices and sensors are used to ensure higher efficiency in production; to detect and prevent problems before they happen; as well as for remote support. The technology is also used to reduce waste, making it possible to monitor, for example, how much water is used in a given production and to identify where its consumption can be reduced.

3D printing - is changing traditional manufacturing, allowing products to be created locally, on demand and according to personalized preferences. In this way, much of the cost of excess materials, natural resources and transportation is reduced.

Artificial intelligence - helps to manage resources and product life cycles more effectively. Big data analytics allow to optimize processes and make informed decisions about future items, productions, business models, etc.

Clean technologies - cover various solutions aimed at protecting the environment. They often offer innovative ways to transform the residues of a given production into resources (such as water or energy) that can then be reintroduced into the product creation process.

Stakeholders of digitalization and digital innovation in the region

Companies

- Bulbera
- Dreamix
- Hyperscience
- Identrics
- INDUSTRIA
- LimeChain
- Motion Software
- Quanterall
- ReCheck
- Sirma Group Holding

Policy makers

- Ministry of Economy and Industry
- Ministry of Environment and Water
- Ministry of Innovation and Growth (MIG)

Academia

- New Bulgarian University
- Nikola Vaptsarov Naval Academy
- Sofia university St. Kliment Ohridski
- Technical university of Sofia
- Technical University of Varna
- University of National and World Economy /UNWE/
- Varna Free University

Associations

- The Bulgarian Association of Information Technologies (BAIT)
- Bulgarian association of software companies (BASSCOM)

Stakeholders of circular economy in the region

Companies

- Biomyc
- Eco Fenix
- Ecoinvest
- Ecopack
- ENovaH20
- Metarex
- Nasekomo
- Remixshop.com
- TexCycle
- Unitrade
- Zona Urbana

Policy makers

- Ministry of Economy and Industry
- Ministry of Environment and Water
- Ministry of Innovation and Growth (MIG)
- Ministry of Regional Development and Public Works

Academia

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Associations

- Bulgarian Association Circular Textile (BACT)
- Bulgarian Association of Recycling (BAR)
- Sustainability Specialists Association (SSA)

Stakeholders boosting circular economy with digitalizion

Companies

- AgroHub.BG - Bulgarian digital innovation hub for agriculture
- “European Digital Innovation Hub in Construction Sector”

Policy makers

- Ministry of Economy and Industry
- Ministry of Environment and Water
- Ministry of Innovation and Growth (MIG)
- Ministry of Regional Development and Public Works

Academia

- Agricultural University – Plovdiv
- New Bulgarian University
- Nikola Vaptsarov Naval Academy
- Sofia university St. Kliment Ohridski
- Technical university of Sofia
- Technical University of Varna
- University of National and World Economy /UNWE/
- Varna Free University

Associations

- Cleantech Bulgaria

Summary

In Bulgaria digital transformation is increasingly recognised to help unlocking the benefits of more inclusive and sustainable growth and enhanced social well-being. In the environmental context, it is largely discussed now that digitalisation can contribute to decoupling economic activity from natural resource use and their environmental impacts. Digital technologies, such as artificial intelligence, blockchain, the internet of things and cloud computing, are vastly recognised as facilitators of the transition to a more resource-efficient and circular economy, by helping to overcome obstacles that stand in the way of the large-scale deployment of greener business models, as well as a more effective delivery of circular economy policies in Bulgaria. Besides the positive attitude to these transformations, there are also many concerns in Bulgaria regarding the risks of potentially negative consequences that could result from a broader uptake of digital circular economy.

Bulgaria has just started to build up a solid basis for the implications of digitalisation for the transition to a resource efficient and circular economy. The strategic papers on national level provide insights into how digitalisation may fuel circular business models in the private sector and underline the role of digital technologies in scaling up circular activities. It is just in the last three years that the public sector perspective started exploring how digital technologies can support effective delivery of more effective circular economy policies, enabling better policy design, reshaping government-citizen interaction and improving implementation of policies. The most proactive stakeholders on national level are also sharing concerns about potential unintended consequences of the digital circular transition like the general risks related to data, security, privacy and transparency. To accelerate the uptake of digitalisation for transitioning towards a resource efficient and circular economy, a better enabling policy framework that promotes digitally enabled circular activities while mitigating the risks that these bring with them, is to be established.

Bulgarian business has an increasing interest in digital innovations in the area of the circular economy. In Bulgaria, there are excellent prerequisites for the development of organic agriculture, for the creation of innovative products and services in a number of sectors such as transport, light industry, as well as in the processing of various materials. The key is in linking the traditional sectors of our country with innovations in the sphere of the circular economy and digitalization of processes. Companies see the business potential of these solutions because it leads to cost optimization and increased profits for themselves. In this way, an amalgam of positive effects is obtained - development of innovations with a sustainable impact on the environment and people and increased competitiveness of companies, therefore improved working and social environment in the regions.

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