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Circular DigiBuild

Boosting Regional Innovation Ecosystems Cooperation in Danube area - Construction, Circular Economy and Digitalisation – Compilation of 13 territorial analysis

(Bulgaria, Austria, Germany, Czech Republic, Slovakia, Slovenia, Hungary, Romania, Croatia, Serbia, Montenegro, Bosnia and Herzegovina, Moldova)

June 2024

Country profiles

BULGARIA

Partners:
Business Agency Association
ReCheck
E-DIH
Vangavis
Associated strategic partners
Ministry of Regional Development and Public Works
Ministry of Economy and Industry
Bulgarian Industrial Association

Construction industry in Bulgaria

The construction sector plays an important role in the European economy. It generates almost 10% of GDP and provides 20 million jobs, mainly in micro and small enterprises. Construction is also a major consumer of intermediate products (raw materials, chemicals, electrical and electronic equipment, etc.) and related services. Due to the economic importance of the sector, its efficiency can significantly influence the development of the economy.

The sector generates around 10 % of the total GDP of the country.

More than 7 000 companies operate in the engineering and more that 5 500 in the field of design and architecture

More that 80 % are SME, and in the design and architecture more that 90 % are micro enterprises with less that 5 people employed. There is a huge percentage of self-employed.

The employed in the construction sector amount to 293 400 or 9.0% of the employed persons in the country,

More than 130 000 persons are employed on a labour and service basis.

98.2% of those employed in the sector are employed in the private sector.

The attitude of employees to change jobs is high (21% of employed persons). The share of workers (65.4%) and specialists (27.1%) who show a tendency to look for other suitable work is the highest.

Employees of enterprises operating in the regions of Sofia-city (38.5%), Gabrovo (15.4%), Plovdiv (11.5%) - are aiming at voluntary resignation

Circular economy in construction in Bulgaria

In Bulgaria, the most urgent need is the effective introduction of circular economy principles regarding the collection and utilization of construction waste.

Construction and demolition waste have been identified as a priority area in the National Circular Economy Strategy and highlighted that the construction industry has a leading role in the transition to a circular economy by developing and implementing resource-efficient solutions to reduce the footprint of its activities on the environment and climate. Only now is panning for activities for a more circular economy in construction by improving the conditions for the design, construction and operation of structures with a focus on minimizing waste, reusing materials and maximizing the life of buildings. Companies in Bulgaria are not familiar with the possibilities for more circularity in construction, there are no clear and guiding regulatory requirements that can stimulate the demand for circular approaches, there are no standards for the use of secondary materials. There are existing different initiatives for linking digital innovations with construction, circular economy with construction, or other innovative approaches in creating inter-sectoral clusters including construction. Most of the existing initiatives are regional, national, cross-border based, or include partners from different countries.But there is still no functioning a wide interregional cooperation form covering nearly all countries focused on digitalisation-led circular economy solutions for more "clean construction" and especially identifying, testing and popularising emerging technologies as a driver for this relatively low-tech industry.

Bulgaria needs a new approach to be conceived and deployed focused on the interdisciplinary and visionary nature of technologies and aiming to deploy a new innovation-led technological paradigm through new-generation digital innovation ecosystems in both traditional and emerging industries, engaging entities from research, business, NGOs, and governmental institutions. Bulgarian partners are determined to lead a strong and devoted partnership to showcase how a dramatical change in the industry paradigm can diminish the impact of construction on pollution and waste of resources in Danube, while inter-regionally harnessing the creation of start-ups and spin- offs in the selected emerging technologies.

Digitalisation in Bulgaria

Bulgaria ranks 26th of the 27 EU Member States in the European Commission Digital Economy and Society Index (DESI) in 2022. Bulgaria’s DESI score grew at an annual average of 9% over the past five years1. Given the positioning of Bulgaria, this growth rate is not sufficient for the country to catch up with the other EU Member States.

On digital skills, despite recent increased efforts, the country remains significantly below the EU average, having a score of 32.6 versus the EU average of 45.7. The proportion of individuals with at least basic skills and above basic

digital skills is well lower than the EU average, the latter significantly so (8% versus the EU average of 26%). Considering the EU's ambitous target of 80% of adults having at least basic digital skills by 2030, the country needs to step up efforts, as more than two thirds of its population lack such skills. Bulgaria also underperforms on the proportion of ICT specialists in the workforce (3.5% versus 4.5% EU average). However, the proportion of female ICT specialists is high.

On Connectivity, Bulgaria score very well on Fibre to the premises coverage (85% of households vs 50% in the EU), it has low prices, but both fixed and mobile broadband take-up is low. In addition, only 25% of 5G spectrum has been assigned (EU average: 56%).

On the business side, the adoption of digital technologies by SMEs remains almost half the EU average. Only 6% of Bulgarian enterprises use big data, 10% cloud and 3% artificial intelligence (AI), as opposed to the EU 2030 targets of 75% for each technology. To support business digitalisation, Bulgaria is making use of European Digital Innovation Hubs. Four European Digital Innovation Hubs proposed by the country received a successful evaluation result2 and another eight proposals got a Seal of Excellence.

Bulgaria is facing many challenges regarding the digitalisation of its public services, as it underperforms in most indicators, except for open data, which is on par with the EU average. Only 34% of internet users interact with the government online (65% in the EU). The supply of digital public services for citizens (with a score of 59 versus an EU average of 75) needs to improve significantly to enable Bulgaria to contribute to the 2030 Digital Decade target of all key public services offered fully online. To achieve this goal, Bulgaria has launched the National Registry reform and defined the path to enhance digital transformation.

To overcome the shortcomings in Bulgaria's digital transformation and to put it on a par with the other EU Member States, there needs to be a continued, sustained effort at political and administrative level that builds on the country's strenghts to deliver on the reforms and investments in all four dimensions. The recent political instability may have significantly affected attempts in this area.

Digitalisation of construction sector in Bulgaria

The readiness of construction industry stakeholders to implement BIM can be positioned at BIM level 0, with some progress towards BIM level 1.

Most of the Bulgarian construction industry does not have any experience, or the latter can be defined as limited in terms of working with BIM. SMEs mostly apply traditional project management workflows involving 2D drawings in their practices.

The major barriers for the digitalisation of construction are:

- the high costs of software and hardware;
- the lack of implementation of bIM by other participants in the process
- the lack of internal expertise and training literature, guidelines and sample documents;

- the inconsistencies of BIM software with local standards.

Other barriers identified include the fact that the software not available in local language; obstacles of a legal nature; interoperability issues between different BIM software and/or other software. To start using BIM, stakeholders need investment in staff training, software that supports BIM, development of internal SIM workflows,

Source of data:
https://digital-strategy.ec.europa.eu/en/policies/desi-bulgaria
https://www.moew.government.bg/static/media/ups/tiny/%D0%A3%D0%9E%D0%9E%D0%9F/%D0%A1%D1%82%D1%80%D0%B0%D1%82%D0%B5%D0%B3%D0%B8%D1%8F%20%D0%BA%D1%80%D1%8A%D0%B3%D0%BE%D0%B2%D0%B0%20%D0%B8%D0%BA%D0%BE%D0%BD%D0%BE%D0%BC%D0%B8%D0%BA%D0%B0/fin_StrategiyaFinal.pdf

AUSTRIA

Partners
Austria Wirtschaftsservice Gesellschaft mbH (aws)
Associated Strategic partners
The Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation, and Technology (BMK)

Austrian Construction Industry

For 2020 it has a turnover of roughly €303 billion. 70,000 enterprises are engaged in industry and construction. Most are small-sized: 80.2% operate with fewer than 10 employees. Only 1% of enterprises employ more than 250 people.

Industry is not necessarily considered a pioneer in digitalization, but has been trying to catch up in recent years. The main challenge areas are:

- Fragmented nature of industry (high multitude of stakeholders and involved partners),
- Frequency of complications within projects prohibiting standardization
- Lack of innovation, largely attributed to time and cost factors
- Fear of error/failure (inhibiting innovation) Specificity of projects
- Building Information Modeling (BIM) remains used by larger-scale projects and not as relevant for SMEs. Important: BIM encouraged by the client and/or required by the government.
- Lack of “one-size-fits-all” digital solutions in the industry, partly out of necessity – projects are too varied.

The Research & Development rate of Austria’s building industry was 0,9% in 2019.

Austrian Digital Business and Austrian Circular Economy

The Austrian circularity rate was 12% in 2020 (Eurostat), with EU average 12.8%. The new goal set was 18% by 2030.

The main gial is to massively limit the use of raw materials. In 2019 DMC (Domestic Material Consumption) and MF (Material Footprint) were both above the European average. Recycling rate is high and at 29.3%

A survey of Austrian companies reports that 58% are familiar with concept of circular economy, 62% need additional information topic, 83% believe circular economy will play role for company in coming years, 88% say company can contribute to circular economy. The most important hindering factors are societal issues, resource scarcity and innovation pressure.

The Austrian Circular Economy Strategy (BMK) main pint is that circularity should become a central guiding principle in all relevant strategies and programmes, similar to climate initiatives. Appropriate indicators and

monitoring has to be organized to assess the progress. A conception and establishment of Circularity Lab Austria is planned.

Source of data:

The Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation, and Technology (BMK). (2022). Austrian Circular Economy Strategy. Vienna.
Federal Ministry of Education, Science and Research; Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology; Federal Ministry of Labour and Economy. (2022).
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Circular Economy Forum Austria & Fachhochschule des BFI Wien. (2021). Unternehmen auf dem Weg zur Kreislaufwirtschaft: Studie zu Perspektiven, Wissensstand und Erwartungen der Österreichischen Stakeholder. Vienna.
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Austrian Wirtschaftsservice GmbH. (April 2023). Kurzstudie "Ökosystem Gebäudesektor ('Building Technology') in Österreich".
Vienna. FH-Doz. Dr. Wolfgang Amann, IIBW – Institut für Immobilien, Bauen und Wohnen GmbH, PF 2, A 1020 Wien, FN 193068 z Handelsgericht Wien.
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Goger, G., Piskernik, M., & Urban, H. (2017). Studie: Potenziale der Digitalisierung im Bauwesen. Technische Universität Wien, Institut für Interdisziplinäres Bauprozessmanagement.
Eichmann, H. (2021). Digitale Transformation der österreichischen Bauwirtschaft und Auswirkungen auf die Erwerbstätigen: Trendanalysen auf Basis von Literaturrecherchen und ExpertInnen- Prognosen. Berichte aus Energie- und Umweltforschung, 15/2021.
STATISTICS AUSTRIA. (2023). Austria Data, Figures, Facts (18th ed.). Vienna. ISBN 978-3-903393-39-4.

GERMANY

Partner
Hof University of Applied Sciences
Associated strategic partners:
Bayern Innovativ – Administrative district HOF,
Chamber of commerce for Upper Franconia,
Bayerische Gesellschaft für Innovation und Wissenstransfer mbH

Status of digitalisation in the construction industry

The construction industry is still lagging behind in the digitalisation index with 53 out of 100 possible index points (https:// www.digital-x.eu/de/magazin/digitalisierungsindex/ baugewerbe)

The index value for the entire German SME sector is 59 points (Digitalisierungsindex Mittelstand 2021/2022).

2/3 of the companies surveyed see a need to catch up in the use of digital solutions (https://www.pwc.de/de/ managementberatung/capital-projects-and-infrastructure/bauindustrie-unter-druck.html)

More than a third (36 %) of companies record and process order data digitally. Another third (31 %) work with a digital construction diary. 20 % use theft warning systems, but also software to locate materials on the construction site more quickly. 42 % of construction companies use web and video conferencing solutions as well as messenger services or chat tools. 20 % of companies wanted to invest more in security solutions in 2022. 93 % of companies want to maintain or increase their spending on digital solutions. 9 out of 10 companies cite the lack of qualified labour as the biggest obstacle to the use of digital solutions (https://www.pwc.de/de/ managementberatung/capital-projects-and- infrastructure/bauindustrie-unter-druck.html).

Circular economy

The construction industry urgently needs concepts for greater sustainability, as the construction sector is responsible for high CO2 emissions. Sustainability is already an important issue for 71 % of the medium-sized construction companies surveyed

Sustainable building materials are increasingly coming into focus. The routes of the construction companies are planned as efficiently as possible to save fuel.

Companies also endeavor to keep the energy consumption of buildings as low as possible in accordance with applicable standards. 44 % of construction

companies are not aware of public funding opportunities for digitalisation projects.

The circular material use rate was 13 % in 2022.

Source of data: Eurostat.

CZECH REPUBLIC

Partner
INCIEN
Associated strategic partners
Ministry of Industry and Trade of Czech Republic,
Czech Green Building Council,
University Centre for Energy Efficient Buildings

Construction and digital economy overview

The turnover in broad construction sector is EUR 60 billion in 2020 (ECSO, EC, 2021). There is an 15.9% increase since 2010. It is driven by growth in three sub-sectors:

- Real estate activities (+32.7%)
- Manufacturing (+23.4%)
- Narrow construction (+15.1%)

The construction sector has a positive medium to long term outlook, with the housing market expected to be one of the main primary growth drivers with digitalisation expected to be one of the key aspects dominating this growth. According the 2021 European Innovation Scoreboard the Czech Republic is a Moderate Innovator

Digitalisation

According the DESI Index 2022 the Czech Republic is ranked #19 overall

In relation to the Human capital is ranked #1, in relation to the Connectivity is ranked #17, concerning the integration of digital technology is ranked #19, for Digital public services is ranked #17.

National policy for circular construction

The National circular economy framework has the following most important documents:

11/2021: Strategic Framework “Circular Czechia 2040” (MoE)
07/2023: Circular Czechia Action Plan for 2022-2027 (MoE)
12/2023: National Public Procurement Strategy (MRD)
05/2024 (pending): Waste Management Plan 2025-2035 (MoE)
06/2024 (pending): Update of Secondary Raw Materials Policy for 2023-2027 (MIT)

In the Action Plan, main actions proposed for construction are:

- Requirements for pre-demolition audits
- Support of expanded use of BIM in both public and private construction projects
- Adoption of EU Level(s) in public procurement

Circular and digital construction

We notice a very limited implementation to date but increasing focus on how to scale-up the circular economy in the local construction industry. Architects, developers and building contractors are preparing for Scope 3 CO2 emissions reporting requirements under existing ESG reporting standards (such as GRI) and the CSRD, and looking for circular solutions to mitigate these emissions.

CZGBC published a Zero Carbon Roadmap for the Czech construction industry in January 2024 (private sector initiative, funded by EBRD and Taiwan Business). There is a strong focus on materials, CDW, recycling and circular economy.

There is an ongoing implementation of national BIM strategy (2017) https://www.koncepcebim.cz/

The key research and innovation programmes are:

- CTU UCEEB
- National WLC methodology and case studies Phase I methodology (ECF)
- INDICATE project (Laudes Foundation, Smith Innovation)
- Circon4Climate (EUKI) - climate impacts of circular construction
- Digital material/buildings inventory of Prague
- ReBuilt - Circular and digital renewal of central Europe construction and building sector (Interreg Central Europe, 04/2023 - 03/2026) - SN, CZ, SK, HU, IT, AT, HR, PL, DE.
- RECONMATIC (Horizon Europe, coordinator CTU in Prague) - innovative solutions, digitalised processes and automated tools for C&D waste management within the whole life-cycle of buildings and infrastructure

SLOVAKIA

Partner
Slovak Business Agency
Associated strategic partner
Ministry of Environment
Circular Slovakia

Construction sector in Slovakia

The Slovak construction sector has a positive outlook in the medium and long term. Despite residential buildings being the largest construction segment, non-residential and infrastructure construction – often supported by EU funding - are expected to be the primary growth drivers.

The share of CS in GDP was 6,7% in 2022. The total turnover increased by 25.7% between 2010 – 2020 (EUR 18.4 billion in 2020). The number of enterprises increased by 2.8% between 2010 – 2020. The number of people worked in CS was164 003 in 2022.

The industry goals are:

- investment EUR 6.9 billion by 2026 (EUR 728.0 million from RRP)
- renovation of 30,000 single-family buildings by 2026
- renovation of 117,000m2 of historic public buildings by 2026
- together 30.0% of primary energy savings

The main barriers of the construction business are:

- shortage of skilled labour workforce
- low innovation rates
- rising cases of late payment

Digital Transformation in Slovakia

According to DESI 2022 is to reach more than 42.6% of enterprises in Slovakia using technologies including artificial intelligence, cloud computing, big data, (and others) and the share of 8% of SMEs in high-tech sectors in the total number of SMEs in manufacturing and services by 2026 as stated in the Action plan for the digital transformation of Slovakia for the years 2023-2026.

Circular economy in Slovakia

The Slovak Republic made notable progress in decoupling environmental pressures from economic activity in the past decades. This was mainly driven by structural and technological changes in its economy since it joined the EU. Despite the positive trends, future materials consumption in the Slovak Republic is projected to increase by more than 50% by 2050 compared to 2017 levels if no additional policy measures are introduced. The increase in materials

consumption is likely to have large associated environmental impacts, including significant increases of greenhouse gas emissions. Our estimates show that up to 70% of the Slovak Republic's greenhouse gas emissions are associated with materials management activities. These trends put the country at risk of missing important environmental and climate goals, including the long-term emission reduction targets under the Paris Agreement. To restrain materials consumption and its associated negative environmental impacts, the Slovak Republic needs to accelerate its transition towards a circular economy. Achieving this requires policies that more strongly incentivise resource efficiency and circular economy along value chains, and the replacement of linear business models with circular ones. Due to its link to greenhouse gas emissions, the circular economy transition will also play an important role in decarbonising the Slovak economy.

On current trends, the demand for raw materials of the Slovak economy will continue to increase significantly. Economic growth and increased consumption drive the demand for raw materials. Metals and non-metallic minerals are increasing at a fast rate due to large manufacturing and construction sectors in the Slovak Republic. Metals and non-metallic minerals are increasing at a fast rate due to large manufacturing and construction sectors in the Slovak Republic. The Slovak Republic increased the share of Green Public Procurement (GPP) from 0.31% in 2019 to 14.74% in 2020 in volume of contracts. The national GPP target aims to achieve a GPP share of 70% by 2030 both in volume and value of all public contracts.

Circular economy in construction in Slovakia

- Introduce a quality standard for recycled construction materials to stimulate the marketing and use of recycled materials and construction products.
- Consider introducing minimum recycled content requirements for certain construction materials within the context of green public procurement (GPP);
- Encourage increased use of secondary raw materials (e.g. recycled steel and concrete) and of renewable materials (e.g. wood) in future deep renovation projects through fiscal incentives (e.g. raw material taxes on aggregates); and
- Introduce mandatory selective demolition, including a system of inspection / audit before and after demolitions take place to increase the recovery of high-quality components and material fractions from construction and demolition waste and to encourage high-quality recycling.

Source of data:
Strategy of the Environmental Policy of the Slovak republic until 2030
Low-Carbon Development Strategy of the Slovak republic
Strategy for the Adaptation of the Slovak Republic to Climate Change - Stratégia adaptácie Slovenskej republiky na zmenu klímy – aktualizácia

Integrated National Energy and Climate Plan 2021-2030 - Integrovaný národný energetický a klimatický plán na roky 2021-2030

Strategy of the Economic Policy of the Slovak Republic until 2030 - Stratégia hospodárskej politiky Slovenskej republiky do roku 2030

Digital Transformation Strategy of Slovakia 2030 - Stratégia digitálnej transformácie Slovenska 2030

Closing the Loop in the Slovak Republic – Highlights

Research and Innovation Strategy for Smart Specialisation of The Slovak Republic 2021-2027 - Návrh stratégie výskumu a inovácií pre inteligentnú špecializáciu Slovenskej republiky 2021 – 2027

https://www.oecd.org/content/dam/oecd/en/publications/support-materials/2022/07/closing-the-loop-in-the-slovak-republic_4bb9131f/highlights-closing-the-loop-in-the-slovak-republic-roadmap_en.pdf

SLOVENIA

Partner
University of Ljubljana
Associated strategic partner
Ministry of digital transformation

Digitalisation

Slovenia made progress - ranked 11th, which is its highest ranking ever.
- above the European average in the field of connectivity (10th) - performed well in terms of household coverage with fixed very high-capacity networks (VHCN) (SL: 72%; EU: 70%), exceeded EU average in Fibre to the Premises (FTTP) penetration (SL: 72%; EU: 50%), lagging behind in the roll-out of 5G technology;
- integration of digital technology (9th) - percentage of companies that use e-invoices (SL: 58%; EU: 32%), cloud services (SL: 38%; EU: 34%), artificial intelligence (SL: 12%; EU: 8%), share of SMEs with at least a basic level of digital intensity (SL: 55%; EU: 55%), less successful in the use of big data;
- digital public services (13th) - 77% of internet users in Slovenia actively use eGovernment services (EU: 65%), below the EU average in the uptake of digital public services available for individuals, above average in the uptake of services for businesses, above average for open data (SL: 92%; EU: 81%);

Circular economy and construction strategy

The Circular Economy is one of Slovenia's strategic development priorities.

closely tied to the Sustainable Development Goals (SDG's) and included in key national documents: A Vision for Slovenia in 2050, Slovenian Development Strategy 2030 and Slovenia's Smart Specialisation Strategy;

In the program period 2021-2027, the new Smart Specialization Strategy in Slovenia has set itself the goal of a green transition, understood as an innovative, low-carbon, digital and knowledge-based transformation of the economy and society.

As one of the four most forested countries in Europe (around 58% of its territory is covered by forests), Slovenia has sufficient timber for long-term development based on domestic raw materials.

Smart Buildings and Home with Wood Chain focus areas:

- Building construction: includes structural elements, building envelope systems, finishing materials, furniture, wood products, and services related to wood resource management;

- Interior Elements: includes household appliances, electronics, lighting, and furniture;

- Building maintenance and management: includes devices, systems, and services for efficient building operation, in harmony with user needs and

environmental demands, as well as connecting buildings to neighborhoods and city infrastructures;

- Smart nearly zero-energy buildings: includes building and interior design approaches for wooden and classic massive buildings (growing need for buildings that provide a pleasant living environment while contributing to reducing CO2 emissions);

Construction industry statistics

In 2022 the Slovenian construction sector exhibited robust growth at 10.4% in real terms, outpacing the EU-27 average.The industry faces challenges such as escalating input costs and material shortages, particularly in the residential segment, where Slovenia lags behind the EU with investments at 2.7% of GDP.

Net exports in construction services added EUR 500 million to Slovenia's GDP.

The employment landscape also saw growth, with a 7.8% increase in the number of workers, driven by specialized construction activities and civil engineering.

The sector faces constraints due to high material costs and a shortage of skilled labor, with 55% of companies citing materials as a main limitation;

Source of data:
https://circulareconomy.europa.eu/platform/sites/default/files/roadmap_towards_the_circular_economy_in_slovenia.pdf,
https://www.gov.si/assets/ministrstva/MKRR/Slovenska-strategija-trajnostne-pametne-specializacije-S5-marec2022.pdf
Digital Economy and Society Index 2022
https://www.gov.si/en/news/2022-07-28-slovenia-makes-progress-again-in-the-digital-economy-and-society-index-desi/
https://fiec-statistical-report.eu/slovenia#:~:text=The%20value%20of%20investments%20in,investment%20in%20the%20EU%2D27

HUNGARY

Partner
Chamber of Commerce and Industry of Pécs-Baranya
Associated strategic partner
Cluster of Applied Earth Sciences

Construction business

Compared to the same period of the previous year 09. 2023, the construction industry production volume decreased by 6%, the production of building construction decreased by 9.5%, while the other constructions increased their share by 0.4% and the construction industry producer increased prices by 13.1%.

Digitalisation

Hungary ranks 22nd out of the 27 EU Member States in the Digital Economy and Society Index (DESI) 2022. Over the last few years, it progressed in line with the EU.1

On Human capital, the country ranks 23rd, scoring 38 compared to the EU average of 46. 49% of individuals have at least basic digital skills, below the EU average of 54%. 3.1% of graduates studied ICT (EU average: 3.9%), and ICT specialists still represent a relatively low share of the workforce (3.9% versus 4.5% in the EU). A significant improvement in both ICT specialists and digital skills is crucial for the EU to reach the skills targets of the Digital Decade.

Hungary performs well on broadband Connectivity. It remained a leader in the take-up of at least 1Gbps broadband, as 22% of households subscribed to such a service in 2021 compared with 7.6% in the EU. The country scores above the EU average also on Overall fixed broadband take-up, 5G spectrum and Fixed very high capacity network coverage (VHCN). This is also important in light of the Digital Decade target of 100% coverage of all households by gigabit networks by 2030.

Although there was progress in the digitalisation of enterprises in 2021, most Hungarian enterprises do not exploit the opportunities offered by digital technologies. 21% of the companies use an enterprise resource planning software to share information electronically (EU average: 38%), and 13% rely on social media (EU average: 29%2) or send e-invoices (EU average: 32%). The situation is similar for advanced technologies: on AI, cloud and big data, Hungary scores well below the EU average, too. Uptake of these services ranged between 3% and 21% as opposed to the Digital Decade target of 75% by 2030. SMEs require a special policy focus, as only 34% of them have at least basic

level of digital intensity (EU average: 55%), as opposed to the Digital Decade target of at least 90%.

For Digital public services, the key indicators show a mixed picture. There was substantial progress on the demand side of e-government with 81% of internet users having engaged with the public administration online in 2021, up from 64% in 2019 and above the EU average of 65% in 2021. However, the quality and completeness of the supply of services for both people and businesses remained relatively low, especially for cross-border service provision, which is key to achieving the Digital Decade target for all key public services to be fully online by 2030.

Regarding digital policies, the National Digitalisation Strategy provides the strategic policy framework for 2021-2030. It is an umbrella strategy which groups, clarifies and, in some cases, complements the measures contained in various other strategic documents. The strategy is structured around the four main pillars of the Digital Decade Compass measured in DESI. These are digital infrastructure, digital skills, digital economy and digital state. Hungary has the very ambitious and challenging aim of exceeding the EU average in digital development by the middle of the decade and of being among the 10 leading EU economies in terms of digitalisation by 2030.

Circular economy

There is a strong rationale for transitioning towards a circular economy in Hungary.

The continuously growing demand for raw materials in the Hungarian economy is expected to exert significant pressure on the environment, putting the country at risk of missing important environmental goals and opportunities to strengthen the competitiveness and resilience of its economy. Despite the notable progress in achieving relative decoupling of economic growth from materials use, several challenges remain related to the country's relatively low performance in resource productivity, circular materials use and waste recycling. On current trends, the overall demand for materials is projected to increase by one-third in 2050 compared to 2017 levels (an increase from 119 million tonnes [Mt] to 160 Mt). Economic growth and increased consumption will drive this demand for raw materials and generate significant negative environmental impacts. A circular economy offers a significant potential to address these challenges, making the consumption of materials more sustainable and generating additional economic value for the country.

A national strategy is required to help steer the transition in the right direction

To fully realise the circular potential of the economy, Hungary will need to adopt a comprehensive circular economy policy framework. Although Hungary has a long-established policy and legal framework for waste management, it has struggled to finance high-quality municipal waste management, and has not yet succeeded in integrating circular economy principles into its sectoral policies

nor has it adopted a whole-of-government approach to the circular economy transition. Additional policies are needed to achieve absolute decoupling of materials consumption and environmental pressures from economic growth. Further improvements in resource efficiency and waste management can lower environmental externalities related to the use of materials and enhance Hungary's competitive advantages. Fostering and investing in recycling and promoting eco-design can increase the availability of green jobs, products and services. The development of product reuse and repair can generate local product loops that create local jobs and make the economy less dependent on imports. A national circular economy strategy can focus policy efforts where they are needed most to complement the existing policy framework.

Source of data:
https://digital-strategy.ec.europa.eu/en/policies/desi-hungary
https://www.oecd.org/en/publications/towards-a-national-circular-economy-strategy-for-hungary_1178c379-en.html

ROMANIA

Partner

Institute for research in circular economy and environment „Ernest Lupan" – IRCEM

Associated strategic partner

Alba Iulia Municipality

Economic performance and innovation

Volume index of production (2015-2020):
in construction of buildings + 64% growth is noticed driven by the First Home Programme (for individual houses) and RRP (for social housing, retirement homes, pre-school, hospitals and healthcare facilities).
in civil engineering a growth of +4.9 is seen for roads and railway infrastructure (EU-led financing through EFSI and EBI funding schemes).
The turnover (2010-020) is increased with +41.9%, it exceeded the pre-crisis level in 2020.
The number of enterprises (2008-2020)is with +11.5%; 66,205 enterprises in 2020.
The number of employees (2008-2020) decreases with - 22.%; 432,511 in 2020, because the labour shortage is due mostly to low wages and migration.
Romania is an <emerging Innovator> (European Innovation Scoreboard 2023)
Innovation-related figures:

- More product innovators (SMEs) and R&D expenditure in the business sector, as compared to 2016
- As compared to 2016, decreasing levels of i) sales of innovative products; ii) PCT patent applications; iii) innovative SMEs collaborating with others; iv) environment-related technologies
- Construction sector: between 2010 and 2019 business enterprise R&D expenditure and R&D personnel declined by 67.8% and 84% respectively.

Digitalisation of economy and society

Romania (30.6) ranks 27th out of the EU Member States. (EU-27 avg. = 52.3) and has a lower relative annual growth
Romanian is lagging behind for:

- lower level of basic digital skills basic digital content creation skills
- lower performance in the integration of digital technologies and digital public services
- EU27 lowest i) share of SMEs with at least a basic level of digital intensity (22%; EU27 avg. =55%) and percentage of enterprises sharing information electronically (17%)

- very low level of digital public services for both citizens and businesses
- e-government public policy for 2021-2030 (adopted in June 2021) is at the beginning of the implementation process.

Strengths in digitalisation:

- high broadband penetration (but low adoption)– above-the-EU-average take-up of at least 100 Mbps fixed broadband (57%) and fixed high-capacity networks coverage (87%)
- high number of ICT graduates (ranking 4th)
- still below the EU27 avg., but increasing employment of ICT specialists, with a high proportion of female ICT specialists in employment (ranking 2nd out of the 27 EU MS)
- lower number of enterprises providing ICT training
- no digital skills strategy yet, but the Romanian RRP includes measures along all DESI dimensions, i.e. digital skills, connectivity, support of businesses and digital public services.

Digitalisation in construction sector

- BIM implementation in Romania by the Romanian architectural and construction sector is limited but rising (ECSO 2022)
- Less than 5% of construction projects use BIM; few BIM Managers

The Research Institute for Construction Equipment and Technologies (ICECON) is involved in national and European research projects related to materials, innovative construction products and technologies and CDW valorisation. The Green Building Council (RoGBC), a non-profit organisation, actively promotes environmental responsibility and energy efficiency for a sustainable built environement, by involving organisations and construction companies

Political measures are taken as the Roadmap for implementation of BIM in the construction projects financed from public funds, within the framework of the Romanian RRP (September 2023).

Examples of digital technologies use in construction sector:

- use of BIM in the refurbishment of Bucur Obor Shopping Center in Bucharest; construction of Tarnaveni bridge in Mures Country;
- road infrastructure in Oradea and extension of Iasi airport, both done by Strabag company

Circular economy in the Romanian construction sector

Romania is only in an initial phase of the transition to a circular economy. In October 2023, the Romanian Government has approved Action Plan promoting the circular economy as part of the NSCE (adopted in September 2022). 9 economic sectors with the greatest potential for circularity were identified:

agriculture and forestry; automotive; construction; food and beverages; packaging; textiles; electrical and electronic equipment; waste; water; wastewater. 52 CE-related measures have been prioritized for the period 2024-2032.

At national level, construction of new building are predominant and less refurbishment and maintenance activities are taking place.

The most important issue is the illegal disposal - the creation of an operational demolition waste infrastructure and the creation of recycled material demand – the biggest CE-related challenges in construction sector.

There is a lack of implemented standards and digital infrastructure for material recovery and optimizing construction operations.

Construction materials are not included in the existing green procurement guidelines.

A good example of good practice is the use of BIM in the Emergency Hospital Sibiu construction project, based on Prometriq Neotwin digital twin solution

Source of data:

European Construction Sector Observatory; Eurostat; European Innovation Scoreboard 2023

DESI 222; European Construction Sector Observatory

BOSNIA AND HERZEGOVINA

Partner
Sarajevo Economic Region Development Agency (SERDA)
Associated strategic partner
The Ministry of Economy of Sarajevo Canton

Regional/national situation in the country in relation to the construction waste

In relation to the construction sector in Bosna and Herzegovina, in Sarajevo Canton is estimated that every year there is 125.000 tons/year of construction waste.

I n Canton Sarajevo, construction waste is mainly disposed of at the Smiljevići landfill and limited amounts of construction waste are used as cover material.

Considering that the landfill can receive limited amounts of construction waste, this waste is often dumped on free surfaces, where new wild landfills of construction material are found.

As a result of the situation, Sarajevo Canton is created a Construction waste management plan. Plan was created 2008. and it is necessary to be updated.

Regional/national situation in the country in relation to the innovations

Unfortunately, innovations in all sectors in Bosnia and Herzegovina are insufficiently supported. The fact that 0.19% of GDP in 2022 was invested in research and development also supports this.

The budget of BiH institutions and international obligations of BiH for the year 2023 foresees 117,000 BAM (58.821,15 €) for the item Grants to non-profit organizations

Support for technical culture and innovation in Bosnia and Herzegovina is growing.Research and development are mostly supported through various programs of international organizations and institutions.

One of such programs is Challenge to Change 3.0, implemented by SERDA, and financed by the Embassy of Sweden in Bosnia and Herzegovina and the Swedish Development Agency SIDA.

Through this program, SERDA supported three companies that introduced new, innovative products and services from recycled construction materials, namely:

- *Recycling of construction waste through the production of concrete pipes (Total project budget: 229.950,00 €);*
- *Production of concrete from recycled material in order to use construction waste and preserve the environment (Total project budget: 74.500,00 €);*

- *Landfill and recycling of construction waste in Sarajevo Canton (Total project budget: 861.361,00 €).*

Regional/national situation in the country in relation to the digital business

Digitalization is being implemented mostly in the private sector focusing on tracking of raw materials, managing production and online sales with expansion during the covid period.

Bosnia and Herzegovina as a developing country has a lot of space for progress in terms of technology and digitization.

The technological progress of companies in Bosnia and Herzegovina varies significantly, ranging from some companies almost not using digital technologies to those that are at a higher level of digital business transformation.

It is evident that there are differences in the level of digital transformation depending on the sector in which companies operate.

The internationalization of business is also a significant indicator of the focus on the adoption of digital technologies in business.

Very few companies have a digital transformation strategy in writing, while other organizations depend on the quality of individuals who are in IT manager positions.

Regional/national situation in the country in relation to the circular economy

In 2019, a total of 40 million tons of natural resources (11.5 tons per inhabitant) were used in BiH, 28.5% more than in 2010.

Resource productivity (the ratio of gross domestic product to domestic consumption of materials) in BiH (0.9) is significantly lower than the EU average (2.2).

Brown industries in Bosnia and Herzegovina have a long tradition. Cheap primary raw materials, when external costs are not included, in combination with a relatively cheap labor force provide the region with a comparative advantage in many sectors and attract foreign investments.

Number of companies in Bosnia and Herzegovina to greater or lesser extent have elements of circularity in their operations, which points to the fact that some of the assumptions for progress in this area exist.

Taking into account good practices in the EU, and the specifics of the economy of Bosnia and Herzegovina, in order to encourage the development of the circular economy in BiH, it is necessary to create a set of incentives that should aim to create value, reduce risk and improve the competitiveness of CE supply chains.

Priority groups of incentives in context of circular economy include:

- Improvement of regulations governing the circular economy,

- Fiscal incentives for the circular economy,
- Introduction of the full price of waste management costs,
- Green public procurement and
- Education and training programs awareness, motivating consumers to sustainable consumption.

SERBIA

Partner
Science and technology park Novi Sad
Associated strategic partner
Provincial secretariat for regional development, inter-regional cooperation and local self-government

Construction business

Serbia's construction industry remains a vital component of the economy, contributing significantly to employment and GDP. However, the extent of digitalization and innovation adoption within the sector varies. While the industry encompasses diverse subsectors and demonstrates some innovative projects, overall innovation penetration may not be as advanced compared to more technologically developed countries. Although digitalization efforts are underway, there is still room for improvement, particularly in adopting technologies like Building Information Modeling (BIM) for project management and enhancing collaboration through digital tools.Building Information Modeling (BIM) – in Serbia will start in 2028

In the Republic of Serbia, construction and demolition waste represents a significant amount of both municipal and hazardous waste (construction material containing asbestos, PCBs, or lead in wood paints).

To date, according to reports from the Environmental Protection Agency, recycling of construction and demolition waste has not been established in the Republic of Serbia, although 80% of construction waste can be recycled. The quantities reported to the Environmental Protection Agency do not reflect the actual situation on the ground, as procedures between the relevant ministries are not fully harmonized. Therefore, the exact quantity of this type of waste cannot be accurately stated.

Another data point is that there are no landfills for construction waste in the Republic of Serbia, and this waste stream is mixed with others. This should not be seen as a deficiency; rather, there should be a focus on developing the sector through circular business models to find ways of adequate resource management. In this regard, special attention should be paid to the construction sector in terms of supporting the development and promotion of circular business models.

Digitalisation

Total registered business entities in Serbia in 2023 –are479 781 and are continually increasing, according to the Serbian Business Registers Agency .

Only a 25% of companies are innovative and digitally transformed.

40% of companies have embraced innovation without undergoing digital transformation, while an equal percentage have neither introduced any innovations nor undergone digital transformation in the past five years

The Digital Platform Economy Index, created by the Global Entrepreneurship and Development Institute aims to compare the digital efficiency of different countries. Serbia is ranked 62 out of 116 analyzed countries, with a DPE index of 27.5. With this score, Serbia is considered to be in the middle compared to the region.

The Global Innovation Index (GII) ranks world economies according to their innovation capacities and currently ranks Serbia at 53rd out of 131 analyzed countries. (source NALED).

An outstanding example for digital innovation is the Morava Corridor – 112 km of the motorway that connects the east and the west of Serbia.

It is the first "smart" road in our country, built with a complete optical infrastructure (speed sensors, acoustic sensors, IP CCTV cameras, smart traffic lights, weather tracking systems, and digital signage). 4G and 5G network have been installed all over this section.

Circular economy in Serbia

As part of the Green Deal, the Circular Economy Action Plan was adopted in March 2020, along with the New Industrial Strategy for Europe.In November 2020, the Sofia Declaration on the Green Agenda for the Western Balkans was signed, with one of its pillars focusing on circular economy.The Action Plan for the Green Agenda, adopted in October 2021, includes the preparation of a strategic document for circular economy as one of its planned activities.

Defining the strategic framework for circular economy in Serbia began in 2019 with an ex-ante analysis, leading to the initiation of the Circular Economy Development Program for 2022–2024.

The program includes an Action Plan for three years, defining general and specific objectives aimed at creating an enabling environment for circular economy development. One of the priorities is supporting businesses to improve production efficiency, remove waste from supply chains, utilize renewable energy and materials, extend product lifecycles, and implement virtual delivery of goods and services.

Important document for promoting the concept of circular economy, presented in May 2020, is the Roadmap for Circular Economy in Serbia. The idea behind the Roadmap for Circular Economy in Serbia is to initiate a dialogue among decision-makers, industry representatives, academia, and civil society, as well as to encourage society to undergo systemic changes in resource management. The selected sectors analyzed and presented in the document are: manufacturing industry; agriculture and food - food surplus and food waste; plastic and packaging; construction sector.

MONTE NEGRO

Partner
ZERO WASTE MONTENEGRO" (ZWMNE)
Associated strategic partner
Environment protection Agency of Montenegro

Construction sector in Montenegro

The sector is focused at implications for Montenegro's construction sector in adopting Eurocodes.

It is accepted that there is a need for enhanced efforts in legislative incorporation and sectoral implementation.

The construction sector contributes up to 3.9% of Montenegro's GDP in 2022.

There are several related initiatives of the Government:

- Adoption of Waste Management Law.
- Establishment of state communal inspection for overseeing waste management plans.
- Alignment with European standards across sectors, including construction;
- Focus on addressing environmental considerations and seizing opportunities for sustainable growth

Digitalization and ICT in Montenegro

ICT companies in Montenegro are employing over 6,000 individuals. They achieved a revenue of 602.43 million EUR in the year 2023, thus forming 10% of Montenegro's GDP.

During 2023 digital business revenues increased by 23% compared to the previous year 2022 and by 41% compared to 2019.

Net profit has also seen remarkable growth, rising by 46% compared to the previous year 2022.

Export activities in the ICT sector have shown significant potential, with computer service exports accounting for a growing share of Montenegro's total exports, increasing from 7% to 21% in the past four years.

Despite the potential for digitalization in various industries, the adoption of digital t echnologies in the construction sector in Montenegro remains relatively low.

Circular economy

The transition to the circular economy is at an early stage in Montenegro. The National Strategy for Sustainable Development by 2030 has been recognized and it goes on to provide a narrative for the circular economy. Recognizing the importance of transition, the Strategy highlighted a priority strategic goal – to improve waste management through implementation of circular economy principles. This is not the only public policy which recognizes the need for a transition towards a circular economy: among other policies that provide a starting point for creating a Roadmap for the Circular Economy are: the Smart Specialization Strategy of Montenegro 2019–2023, Industrial Policy of Montenegro 2019–2023, National Waste Management Plan of Montenegro 2015–2020, Waste Management Strategy of Montenegro until 2030 and the Energy Development Strategy of Montenegro 2014–2030.

However, strategic documents in Montenegro observe the circular economy through waste management lenses, focusing on recycling, landfill management and separate waste collection. The need for resource efficiency is viewed only through the aspects of energy efficiency and waste-to-energy.

The transition to a circular economy requires a continuous systemic change.

The responsibility for driving this transition lies within all actors of quadruple helix. The business sector should recognize the value of circular business models, implement circular solutions on the ground, encourage consumer behavior change, promote local and regional value chains, invest in research and development, and support green pioneers.

Valuable construction and demolition waste is currently being deposited in landfills or not managed safely.

Prevention, reuse and recycling construction and demolition waste could address this gap, fostering circular value chains within the built environment.

Utilizing these secondary raw materials could establish local circular construction material supply chains, potentially leading to the development of a local material bank.

Source of data:
"Roadmap – towards the circular economy of Montenegro", 2022, The United Nations Development Programme (UNDP) in Montenegro

CROATIA

Partners
TERA Tehnopolis Ltd.
Innovation Centre Nikola Tesla
Associated strategic partners
Ministry of Regional Development and EU Funds
Development agency of Osijek-Baranja County

National situation in the construction sector

The Croatia construction market size was nearly 11 billionEUR in 2023 and the market will achieve an average annual growth rate of more than 3% during 2025-2028. The market growth over the forecast period will be supported by an increase in the total construction permits issued and the government's investment in transport infrastructure projects. The infrastructure construction sector accounted for the highest market share in the Croatia construction market in 2023.

The key sectors in the Croatia construction market are commercial construction, industrial construction, infrastructure construction, energy and utilities construction, institutional construction, and residential construction. In 2023 the construction business has contributed 6% of GDP, 54% engagement on buildings, 62% engagement on new facilities. An abundance of construction sites and works were started due to 2020 earthquakes and EU/state funding for recovery. One of the main challenges is the strong import of foreign workers.

There is no legal framework mandating circular economy principles in construction or digitalization.

Regarding circularity in construction, only few projects were strated. First projects of raising awareness regarding circularity among construction SMEs started recently, e.g. project BLOOM. In relation to digitalisation and construction, the first projects that used BIM from the very start are already implemented – a large luxury camp in Istria, the Sports hall in Sisak.

Most of the sector leaders already started using digital tools for management of construction projects, e.g. PlanRadar.
The first full-scale smart building with predictive control (UNIZG-FER skyscraper building, 2018-2023) was piloted.

Digital business in Croatia

Croatia ranks 21th of 27 EU Member States in the 2022 edition of the Digital Economy and Society Index (DESI). Between 2017 and 2022, Croatia's DESI score grew slightly more than that of the EU1. Despite performing well in

digital skills, there is still a persistent gap as regards ICT specialists, which in Croatia accounts for a lower percentage of the workforce than the EU average. The shortage of specialists is significantly affecting businesses' integration of digital technology, preventing enterprises, SMEs (Small Medium Enterprises) in particular, from tapping the full potential offered by digital transformation.

Croatia still scores low in the penetration of 100Mbps services, Very High Capacity Networks and 5G coverage and in the broadband price index.

Although the share of ICT specialists in the workforce is below the EU average, Croatia's performance on enterprises' investment in ICT training and on ICT graduates is above the EU benchmark. Despite the actions already initiated to foster digital skills for all, a notable change of pace in the country's digital skills readiness is crucial for the EU to reach the Digital Decade target on ICT specialists.

Croatia scores well in terms of open data, but its score is counterbalanced by poor performance in the field of Digital Public Services, with a small number of users, a scarce use of prefilled forms and limited provision of public services both to citizens and enterprises. Ongoing efforts need to be continued to achieve the Digital Decade target of 100% online provision of key public services for citizens and businesses. Digital technologies have continued to gain popularity among Croatian enterprises, with 35% of them using cloud solutions, 43% using e-invoices and 9% using AI technologies. While these figures lay the foundation for Croatia's contribution to the Digital Decade targets for business digitalisation, the uptake of key technologies such as big data and AI has strong potential to be improved even further.

- Human Capital (rank 9/27; score 51.8/ score EU: 45.7)
- Connectivity (rank 24/27; score 48.1/ score EU: 59.9)
- Integration of digital technology (rank 14/27; score 36.7/ score EU: 36.1)
- Digital public services (rank 23/27; score 53.6/ score EU: 67.3)

Strength: 63% of 16-74 population with basic digital skills (highest in the Danube region, 8th in the EU), of that 31% with advanced digital skills

Weakness: Lack of ICT specialists which significantly affects the integration of digital technologies into businesses, especially for SMEs, though ICT graduates are above EU average, but a significant "brain drain" trend is noticed.

Digitalisation topics in Recovery and Resilience Plan (RRP) for Croatia are set near to the minimum share requested by EC of 20%. Croatia has its flagship innovation company - Rimac Group. Other innovators are in the fiemd of Vehicle Battery Management Systems, Electric/Hybrid Sports Cars, RoboTaxi, Stationary Battery Storages.

Circular economy in Croatia

Croatia is lagging behind other EU member states in transitioning towards a circular economy. At the core of the circular economy (CE) concept is the decoupling of economic growth from natural resource use. This can be achieved

by designing-out waste and pollution, keeping products and materials in use, and regenerating natural systems. Croatia's economy is only 2.7 percent circular, compared to the global average of 8.6 percent, while the EU is 12.8 percent. This means that more than 97 percent of all materials consumed each year never make it back into the economy as raw materials. Even though the Croatian Government has acknowledged the need to move towards a CE, and national and local authorities have made efforts focusing on waste management and green public procurement, this only partially covers the actions needed to reach the circular economy goals defined by EU legislation.

There is still no dedicated strategy for CE thus far, but its elements are built in other strategies – the Waste management plan, the Waste prevention plan, the Food waste prevention plan, the Low-carbon development strategy and others.

By 2020 only 3% materials are related to circularity principles, 34% of municipal waste is recycled, and 60% is the recovery rate of construction waste.

Croatia Waste management plan 2017-22 targets are:

- Separate collection of 60% of municipal waste and 75% of construction waste
- Establish a management system for wastewater sludge and marine litter
- Low Carbon Development Strategy 2030
- Minimisation of landfilled biodegradable waste, and use of biogas for the production of biomethane, electricity and heat

Source of data:
https://www.globaldata.com/
Digital Economy and Society Index (DESI) 2022, Croatia
Croatia Circular Economy Approaches in Solid Waste Management: Diagnostic Analysis, The World Bank, 2022

MOLDOVA

Partner
Business Advisory Centre

Construction

Construction Industry market value is of 929.4 millions € (2022), and accounts for 6.5% of Moldova GDP.

Moldova's total construction output inched down by an annual 2.5% in 2023 according the country's statistical office, BNS. Moldova’s construction output edges down 2.5% y/y in 2023. The volume of maintenance and current repair works fell by an annual 12% in 2023, while capital repair works jumped by 40.4%. Other construction works rose 17% on the year.The volume of works performed on residential buildings and engineering constructions shrank by 16.1% and 9.3%, respectively. Works performed on non-residential buildings saw an annual hike of 20.3%. Moldova's construction output fell by an annual 14% in 2022 after edging down by 0.3% in 2021.

A 218% increase since 2013 has been registered. The volume of Capital repair works and other construction works increased by 40% in 2023.

There are no projects though that link construction industry to circular economy or to digitalisation initiatives.

Digitalisation

More than 60% of SMEs reach the basic level of using digital technologies in business management and product and service development. More than 40% of companies in Moldova have access to digital platforms for their products and services

At least 50% of Moldovan companies use Cloud/AI/Big Data technologies. Moldova is ranked #72 in the E-Government Development Index countries top.

100% of key public services in Moldova are available online.

The Republic of Moldova will rank among the top 50 countries according to the ITU Global Cyber Security Index.

The country is aiming at increasing the export of IT and BPO services by 15% annually and ensuring a degree of local adoption of at least 10% of the digital solutions developed in Moldova.

Moldova is also investing efforts in increasing from 6 to 10% the number of students trained in digital technologies in various fields.

Strengthening Moldova's image as a digital nation is amongst the country's ambitions. E-signatures are mutually recognized between Moldova and the European Union countries.

At least 30% of public e-services are available in the cross-border scenarios.

Some first start-ups from the Republic of Moldova reach the status of unicorns and at least 10 Moldovan products reach a valuation of US $100M.

Circular economy in Moldova

The Moldovan government is about to approve at mid 2024 the 2024-2028 Green and Circular Economy Promotion Program, creating new green jobs and promoting the transition of businesses to sustainable practices.This program aims to facilitate the shift to a circular economy, where waste is converted into raw materials and reintroduced into the economic cycle.

The program includes comprehensive measures to:

- encourage investments in the green economy;
- stimulate innovation and start-ups towards sustainable practices;
- increase employment opportunities in the green sector;
- optimise the consumption of natural resources;
- reduce environmental impact and carbon footprint.

By promoting ecological practices, the government aims to support economic growth, improve the quality of life for citizens and ensure a clean, sustainable and healthy environment.

The 2024-2028 Green and Circular Economy Promotion Program will help reduce carbon emissions by encouraging businesses to adopt sustainable practices, promoting the use of renewable energy sources, enhancing energy efficiency, and implementing circular economy principles to minimise waste and reuse resources.

The estimated cost of the Program is over 200 million lei (40.2 million euros), with 100 million lei (20.1 million euros) from the state budget and 100 million lei from other sources. Key measures include classifying green economic activities and introducing green skills in public administration.

Another important strategic document is the National Waste Management Program for 2023-2027 with the following objectives:

Objective 1: Adjusting the legal framework in the waste management field to establish requirements for waste reuse and other uses.

Objective 2: Reducing the quantity of generated waste, increasing the recovery and recycling rate of products subject to extended producer responsibility by up to 40-60%, and raising awareness of the importance of waste management by 2027.

Objective 3: Developing the necessary infrastructure and services for waste management within an integrated system, aiming to prevent environmental pollution, reduce the quantities of deposited waste, and increase the recycling rate.

Source of data:
https://www.ceicdata.com/
Republic of Moldova Digital Transformation Strategy 2023–2030
2024-2028 Green and Circular Economy Promotion Program
National Waste Management Program