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.

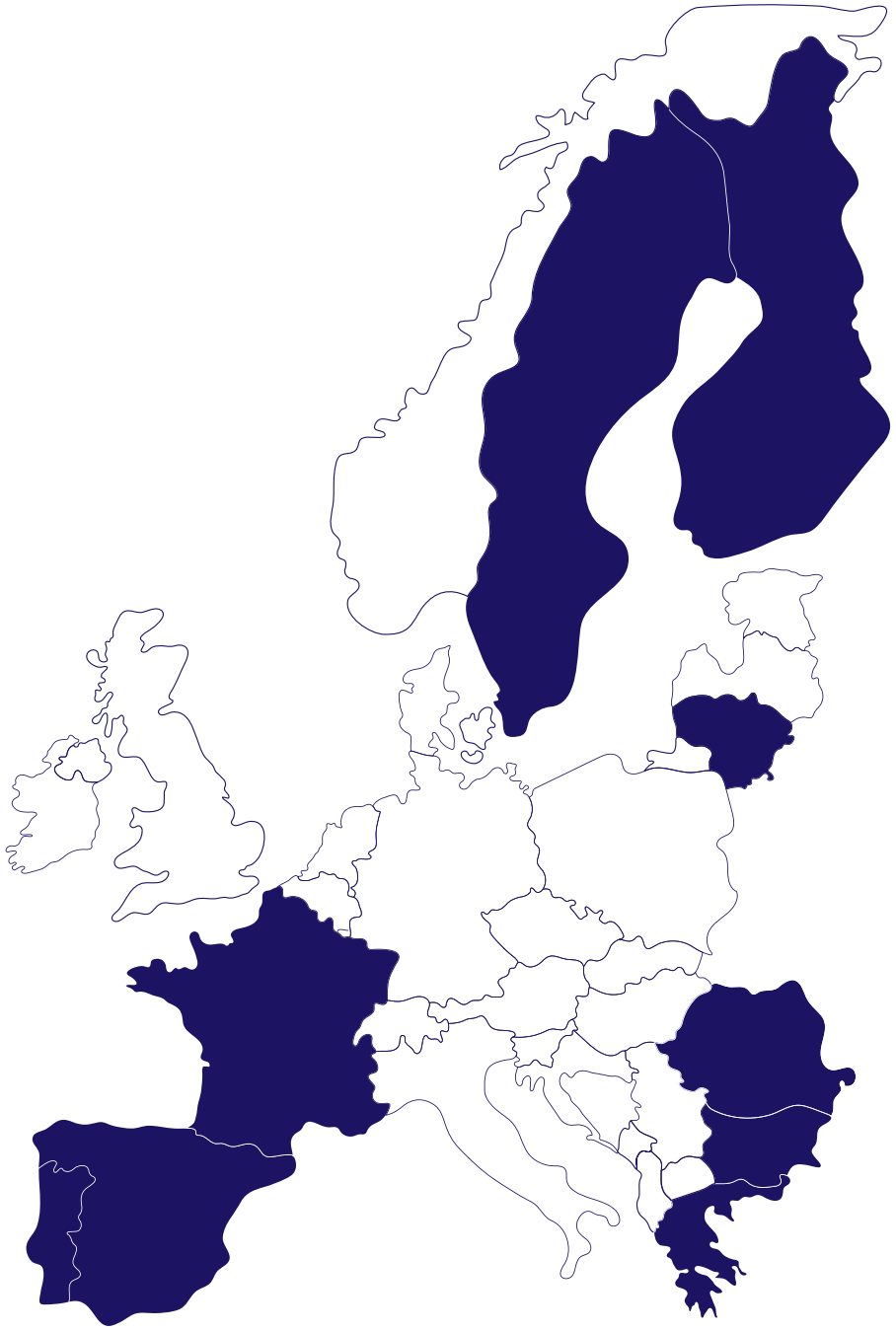
The analysis shows that the level of maturity of the regions in the field of digitalization and circular economy varies, but the general observation is that all the regions included in the analysis have made recent progress and many policies and potential projects are underway and recently initiated. 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 the Region Västebotten in Sweden. The analyses of each partner region and more information of the CEI Boost can be found on the project website: *interregeurope.eu/cei-boost*

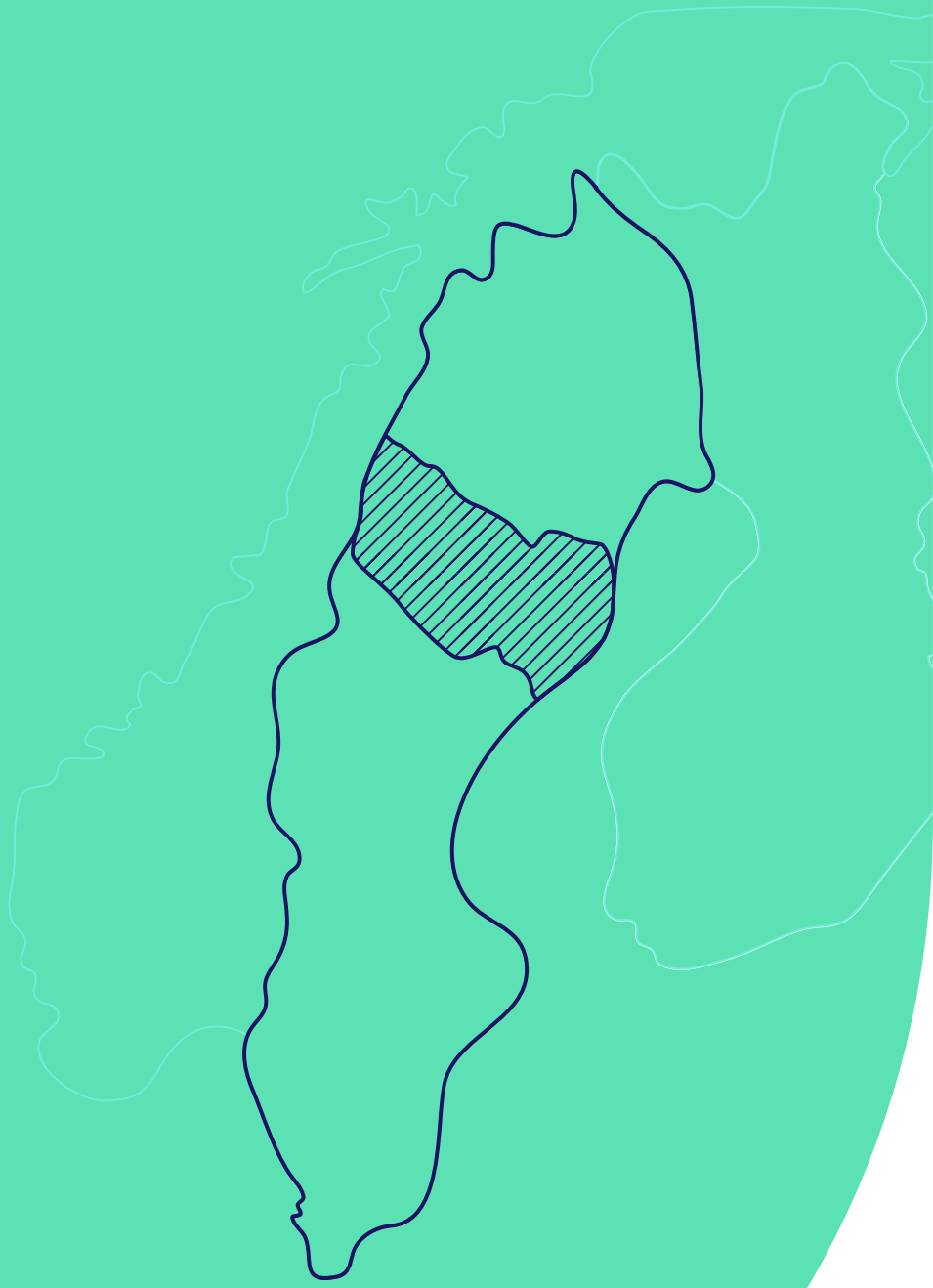
CEI Boost Partners

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



Region Västerbotten

Region Västerbotten (55,432 km2) is the second biggest region in Sweden with a population of 268,067 inhabitants. The largest cities are Umea and Skellefteå. Region Västerbotten's main mission is to focus on the county's growth and development. The main activities of the Region are regional development planning, business, entrepreneurship and innovation, tourism, energy, environment and climate, expertise and training, transport infrastructure and communications, information technology and communication, renewal of public services, international engagement and community work. Key industry sectors in Västerbotten include high-tech processing industries, forestry, energy and cleantech, life science, ICT, and service industries. Västerbotten has a good innovation capability and has been highlighted as a leading innovative region in European comparisons.



Digital innovations and digitalization in the region of Västerbotten

Västerbotten has good conditions for digitalization – not least in terms of broadband coverage and connectivity, combined with a large human capital and high level of internet use in the population. Västerbotten is also ranked as one of the most innovative regions in the EU. The good partnership that exists between municipalities, regions, academia and business in the country has continued. A powerful broadband network has been further developed under a joint initiative. Another joint initiative takes the form of a common service development platform created for the municipalities and supports digitalization for the entire county. Within the framework of Digital Impact North, academia and the public sector have gathered around the joint promotion of digitalization. A growing business community has jointly contributed to the continuation of digitalization as an area of strength in Västerbotten.

The starting point for the work to take advantage of the possibilities of digitization and strengthen the regional innovation and change capacity in Västerbotten are the regional strategies Regional Development Strategy 2020 – 2030 (RUS), Regional Innovation Strategy (RIS) and Regional Digital Agenda (RDA).

The regional digitalization strategy for Västerbotten will strengthen our ability to achieve the regional strategy development goals. Digitalization will be a key factor in achieving all the strategic goals and priorities but this requires increased capacity for digital transformation. The strategy highlights focus areas that overall strengthen this and contribute to Västerbotten continuing to be a driver of digital development.

Strategy development has been characterized by joint participation and contributions from academia and the public sector, business and the non-profit sector. Many of these contributors have also been involved in the development of the regional innovation strategy which can provide them with guidance, inspiration and a platform for collaboration.

Similarly, to the National Strategy for a Sustainably Digitised Sweden, the basis for this strategy is to make the best use of the opportunities provided by digitalization for the creation of useful services for people, even if the strategic target group is primarily public actors, companies and organizations.

The regional digitalization strategy sets a common direction for Västerbotten in terms of digitisation. It will provide support and be a source of inspiration for actors within the public sector, academia, business and civil society in Västerbotten, which are the main target groups for the strategy. Along with the regional development strategy for Västerbotten, it is also the basis for the prioritisation of digitalization projects that are co-financed by European funds and regional project funds.

The strategy identifies issues for which regional collaboration and a focus on specific areas of development will help us take advantage of the potential of digitalisation and contribute to our ability to meet the challenges of digital transformation. This supports the achievement of the development goals of the regional development strategy for Västerbotten.

The regional digitalization strategy contributes to achieving the social goals of the regional development strategy, that focus on Västerbotten as being a living and circular place. The digitalization strategy also highlights the challenges and opportunities that guide the work towards the three strategic directions of development: a cohesive region, an equal and equitable inclusion and a region that pioneers transition.

Five strategic areas of focus have been identified as prerequisites for digital transformation in Västerbotten and are discussed in the regional digitalization strategy. Each focus area encompasses broad issues that address fundamental functions, as well as more pointed efforts for driving and developing digitalization in Västerbotten, as follows:

- Digital infrastructures
- Digital inclusion
- Digital competence
- Digital safety
- Digital innovation

The regional digitization strategy is realized, among other things, through the implementation of projects and collaborations, many of them with EU funding. Umeå University together with the partners RISE, SLU, Umeå municipality and Region Västerbotten form a European Digital Innovation Hub (EDIH), Seal of Excellence. Examples of projects include:

- Societal development through Secure IoT and Open Data, SSiO (Luleå University of Technology)
- Digital innovation power (Stiftelsen Adopticum)
- Digital Impact North (Umeå University)
- Digital transformation in Västerbotten's industries (Region Västerbotten)
- OSN – Sustainable broadband in Västerbotten (Region Västerbotten)
- Game attraction North (Skellefteå Science City).

The status of circular economy in the region

Västerbotten is today one of the most progressive regions in Sweden in terms of circular economy. The region has a strong tradition of innovation and entrepreneurship, and there

is a strong commitment to developing a more sustainable economy. In addition, there is a great demand for sustainable products and services, which means that there is great potential for circular business models.

An overarching focus of the Regional Innovation Strategy in Västerbotten County 2022-2030 is to support the realization of the overarching sustainability goals in the regional development strategy, "A living place" and "A circular place" that link to the seventeen goals in Agenda 2030. A fast and global sustainable transition requires renewal and transformation, and circularity is therefore a key issue for the development work in Västerbotten. Businesses in all spheres of society are affected and need to develop their ability to change their business models in a short period of time. Innovations and investments in new production techniques and systems, circular material flows and circular production systems are needed, as well as integrating sustainability into all operations.

Västerbotten's development work focuses on driving the green transition, also by developing sustainable energy systems. The availability of electricity in the form of above all hydropower, but also wind power means that companies and operations with large energy needs establish themselves in Västerbotten as part of the transition to fossil-free energy. The large establishments and investments in batteries and hydrogen have great potential to further develop electrification with energy storage technologies. At the county's university, there is R&D in several central areas, for example alternative fuels and energy. Within the mining and minerals area of strength, there are good prospects for further developing innovations for a green transition and circular value chains. Metals and minerals are a central component in the work with a green transition, as they are in demand in, for example, infrastructure, electronics, communication equipment and sustainable energy production systems where solar cells, wind power, battery production and electronics require access to new raw materials. Several companies work with circularity as part of the business concept. One example is the company Northvolt, which recycles car batteries.

Region Västerbotten runs the Sustainable Regional Development project within the framework of the government mission that the Agency for Growth leads during 2019-2023. The project's focus area sustainable places centers on circularity and two different tracks within the circular economy have been implemented, i.e. circular business development and circular procurement.

Region Västerbotten has developed a circular economy plan, which aims to increase the share of circular products and services in regions. Some examples of measures are:

Extend the life of products and materials:

- Invest in repair and recycling services
- Design products that are easy to repair and reuse
- Increase the use of recycled materials in production

Reduce the amount of waste generated:

- Increase the collection of waste
- Reduce the amount of waste that occurs by using resources more efficiently

- Increase the use of compost and other alternative waste management systems

Increase the recycling and reuse of materials:
- Invest in new recycling facilities
- Develop new recycling techniques
- Increase training on recycling and reuse

Develop new circular business models:
- Invest in circular companies
- Develop new incentives for circular business models
- Increase training on circular business models

Other important players in Västerbotten in terms of circular economy are business, the municipalities and academia. Business is an important driving force for circular economy, and there are a large number of companies in Västerbotten that work with circular-economy-based business models. Some examples of companies are:

Re:newcell, which recycles textiles into new raw materials
Northvolt, which recycles car batteries

Several municipalities in Västerbotten have drawn up circular economy plans.. Umeå Municipality and Skellefteå Municipality are participating in the initiative on Climate Neutral Cities 2030. Umeå Municipality's program for Climate Neutral Umeå has four focus areas, including focus area 4 Circular economy is one and the work to produce a roadmap is ongoing. A central event in the work has been OECD Urban Studies "Circular economy in Umeå (OECD, 2020). In the OECD's report, recommendations are given on concrete measures to improve Umeå's ability to take initiative and enable a transition to a circular economy. The municipality of Umeå has largely followed the OECD's recommendations and in projects such as "The low carbon location 2.0" (ERUF 2020-2023) methods and working methods for, among other things, circular procurement have been developed. The project "Climate neutral Umeå 2030" (2021-2024 Viable Cities innovation program) is being built up and new forms of cooperation and co-creation are being developed together with five other parties.

The academy also has an important role to play, and there are several universities and colleges in Västerbotten that conduct research on the circular economy. Some examples of universities and colleges that conduct research on the circular economy in Västerbotten are Umeå University, Luleå University of Technology and the Swedish Agricultural University.

The regional strategy for circular economy is realized, among other things, through the implementation of projects and collaborations, many of them with EU funding. Examples of projects include:
- RE Start Umeå to be implemented in 2022-2023 in Umeå (Coompanion, Umeå municipality, Diös, Vakin)
- Cebans, network and program for circular development in northern Sweden (Esam in collaboration with Cradlenet and North Sweden Cleantech)
- Circular business models for strengthened competitiveness (Vilhelmina Municipality)

- Circular Västerbotten (Companion in collaboration with Umeå Municipality)
- Green Transition North. Circular economy (Luleå University of Technology in collaboration with Skellefteå Science City)

Digitalization & Circular economy in the region of Västerbotten

The interaction between the digital development and the circular economy is expressed in the regional strategies.The two overarching sustainability goals in the regional development strategy are "A living place' and 'A circular place'The path to a sustainable Västerbotten has three directions and six priorities, as shown by Figure 1. They are also parts of a complex system that interacts at all levels both vertically and horizontally. Within the whole system the ability to develop capacity for collaboration and interaction between the actors has therefore been given the highest priority in the strategies.Digital transformation has an impact in all of these areas in a way that is illustrated in Figure 2 and 3.

Therefore at a higher level, the main driving factors of the interaction between digital transformation and circular economy in Västerbotten is the goal to develop the ability for collaboration between the actors in the regional development system – linearly and interactively.

Implementation and follow-up

The County Council of Västerbotten – Region Västerbotten – is authorized with the regional development responsibility in Västerbotten County and is responsible for driving the implementation, following up and evaluating the regional strategies.

The implementation takes place through the initiatives in the direction of the strategy that have been created by all actors in the county. An important implementation tool is different types of partnership and other forms of collaboration.

For example, today there is Digital Impact North, which is a strategic partnership for digitalisation between Umeå University, the Swedish University of Agricultural Sciences, RISE, Umeå Municipality and Region Västerbotten. The county municipalities collaborate in the area of digitalisation on both a strategic and practical level and there are examples of joint procurements and operational organisations.

The strategy is monitored and evaluated as part of the regional development strategy. An examination of the relevance of the strategy based on the following up and evaluation is conducted once in each term of office. Structured working methods for follow-up, evaluation and learning of the regional development strategy are on the Region Västerbotten agenda for strategic learning and linked to the annual wheel of strategic learning when it comes to supporting the realization of the overarching sustainability goals in the regional development strategy.

Figure 1 - Goals, direction and priorities in the regional development strategy for Västerbotten

Goals, directions and priorities in the regional development strategy for Västerbotten.

Figure 2 - Role of Digital Transformation within the regional development strategy of Västerbotten

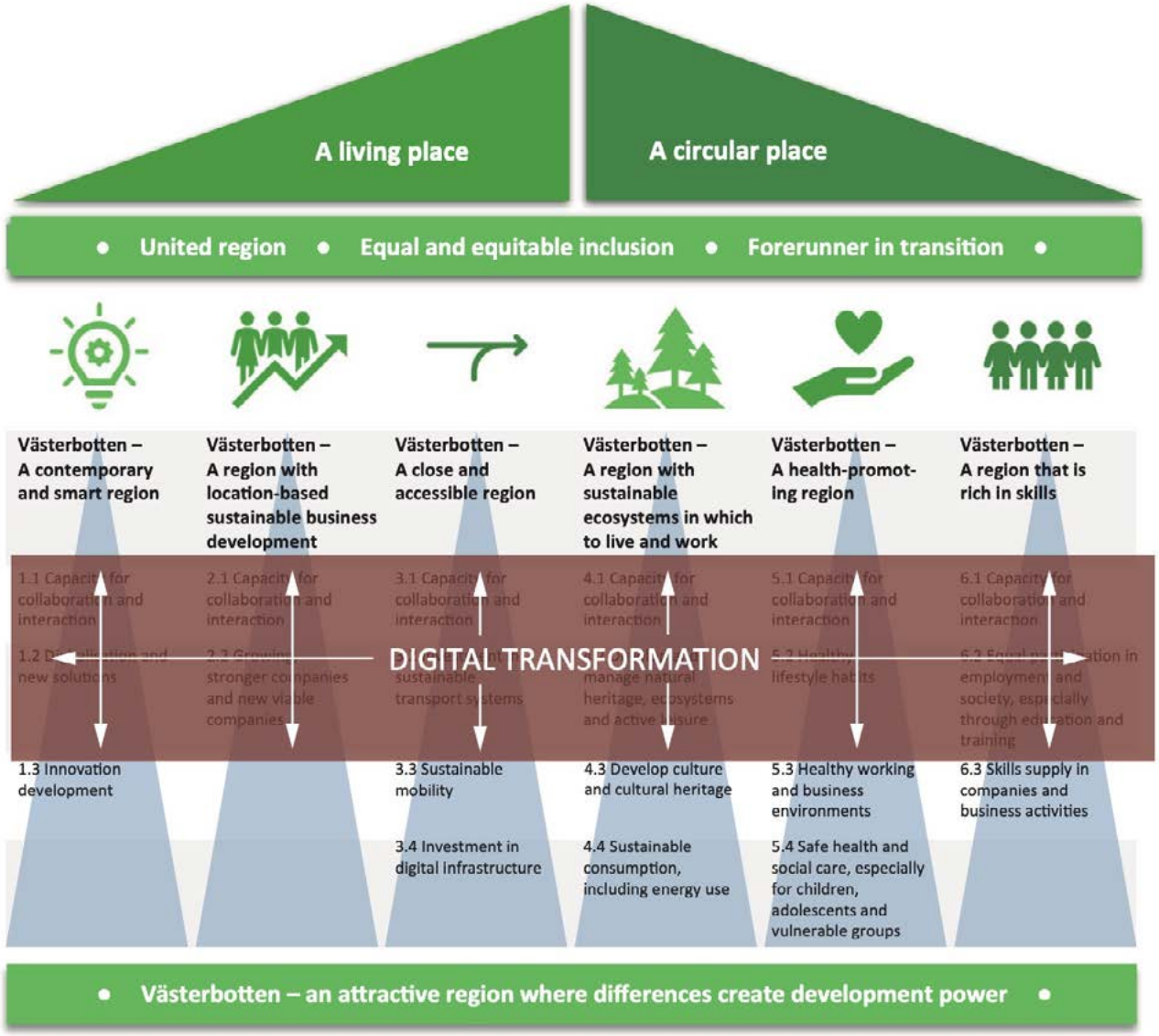
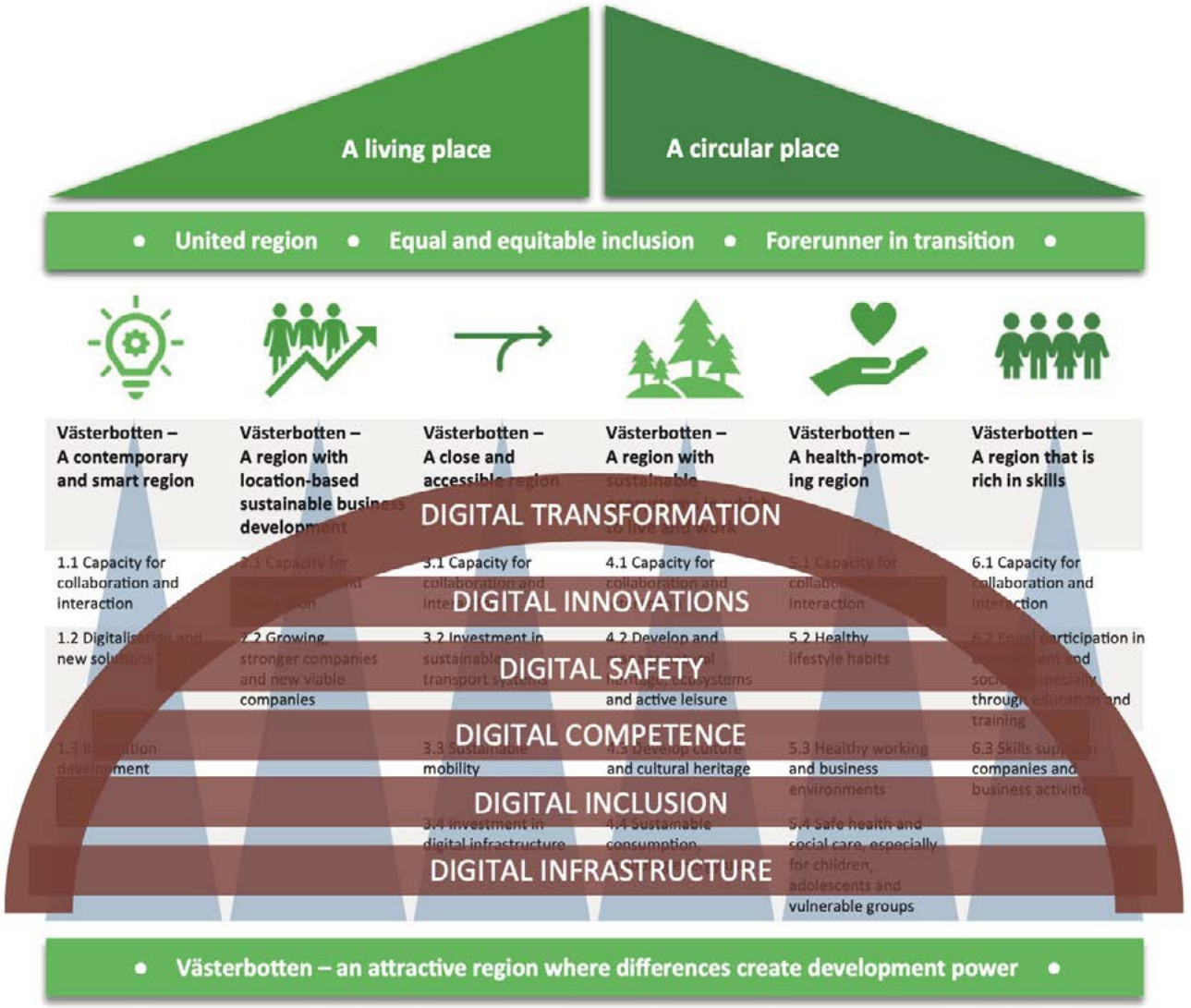


Figure 3 - Breakdown of digital transformation contribution to the regional development strategy of Västerbotten



Stakeholders of digitalization and digital innovation in the region

Companies

- Algoryx
- Sokigo
- Data Ductus
- Elastisys
- Vitec Software Group
- Umeå Energi

Policy makers

- Region Västerbotten
- 15 municipalities

Academia & Research Institutes

- Umeå universitet
- Luleå tekniska universitet
- RISE
- Sveriges lantbruksuniversitet (SLU)

Associations, projects and others

- European digital innovation hub, Seal of excellence
- Digital Impact North
- Inlandets Teknikpark i Vilhelmina
- Process IT Innovations
- Skellefteå Science City
- Uminova Innovation
- Project Support Offices in different organizations

Stakeholders of circular economy in the region

Companies

- Re:newcell, som återvinner textilier till ny råvara
- Northvolt som återvinner bilbatterier
- ESAM
- Diös
- Vakin
- Umeå Energi
- Skellefteå Kraft

Policy makers

- Region Västerbotten
- 15 municipalities

Academia & Research Institutes

- Umeå universitet
- Luleå tekniska universitet
- Sveriges lantbruksuniversitet
- RISE

Associations, projects and others

- Cebans
- Cradlenet
- North Sweden Cleantech
- Companion
- Almi Företagspartner
- Umeå Eco Industrial Park

Stakeholders boosting circular economy with digitalization

Policy makers

- Region Västerbotten
- 15 municipalities

Academia & Research Institutes

- Umeå universitet
- RISE
- Luleå tekniska universitet

Associations, projects and others

- Inlandets Teknikpark i Vilhelmina
- Process IT Innovations
- Digital Impact North
- Project Support Offices in different organizations
- Viable Business Hub

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