METACITIES - Connecting Pockets of MetaCity Excellence around the Baltic Sea Region

METACITIES: JOINT ACTION PLAN

Horizon Europe | HORIZON-EIE-2023-CONNECT-01-02
HORIZON-CSA -GA# 101134225

Deliverable No.	**D4.1**	
Deliverable Title	MetaCity Joint Action Plan	
Due Date	30.11.2024	
Deliverable Type	Report	
Dissemination level	Public	
Written by	Metacities project consortium partners	29.11.2024
Checked by	Ari Saine, the city of Oulu	28.11.2024
Approved by	Yassman Fooladianpour, EIT Digital	29.11.2024
Status		Final

This project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement no. 101134225.

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or EISMEA. Neither the European Union nor the granting authority can be held responsible for them.

Revision history

Version	Date (day, month, year)	Who	Changes
1.0	8.08.2024	Ari Saine	Document created. Preliminary structure.
1.1	30.9.2024	Ari Saine	Interim version of Joint Action Plan
1.2	17.11.2024	Ari Saine	Draft version of Joint Action Plan
1.3	27.11.2024	Ari Saine	Joint Action Plan Document ready
1.4	20.03.2025	Yassman Fooladianpour	Template updated

Contents

LIST OF FIGURES AND TABLES

LIST OF ABBREVIATION

Acronym / Short name	Meaning
EU	European Union
KPI	Key Performance Indicator
CRM	Customer Relationship Management
LL	Living Lab
WG	Working Group
BSR	Baltic Sea Region

JAP	Joint Action Plan
NEIA	New European Innovation Agenda
LoI	Letter of Intent

1 PROJECT ABSTRACT

MetaCity is a novel smart city and urban innovation concept, focusing on open innovation which is supported and encouraged by digital environments and social networks. MetaCity is responding to leveraging on the post-pandemic transition to virtual co-operation and virtual urban services.

MetaCity is an emerging regional policy objective, already in regional policy planning in Oulu Region and Latvia. MetaCity aims to expand ICT-oriented Smart City development to a wider base of regional innovation capabilities and innovation capture, including for example service innovations and social innovations.

The METACITIES project connects a balanced mix of MetaCity and Smart City ecosystems: definite global thematic leaders, thematic followers, urban capital areas, mid-size central towns, and more rural regions.

The METACITIES project builds these connections in the EU macro-region Baltic Sea Region (BSR), with all project regions residing in the EU BSR programme area, and representing 5 / 8 of the total BSR countries.

The main objective of METACITIES is to speed up, consolidate, align and leverage the existing MetaCity and Smart City initiatives of the partner regions, and through this, build the world's leading connected MetaCity Region across the Baltic Sea (BSR).

The project process carries the four pre-identified themes through first (WP2) collecting and analysing the knowledge base (data, ecosystem opinions) in each region, then (WP3) through a wide penta-helix stakeholder involvement in co-identification, co-ideation and co-design of opportunities as a basis of the BSR MetaCity joint action plan, supported by theme-specific cross-regional Working Groups. And finally (WP4) narrowing down the joint action plan focus through decisions on prioritization and co-funding and devising the actual plan document, to be then quickly implemented in the post–project activities.

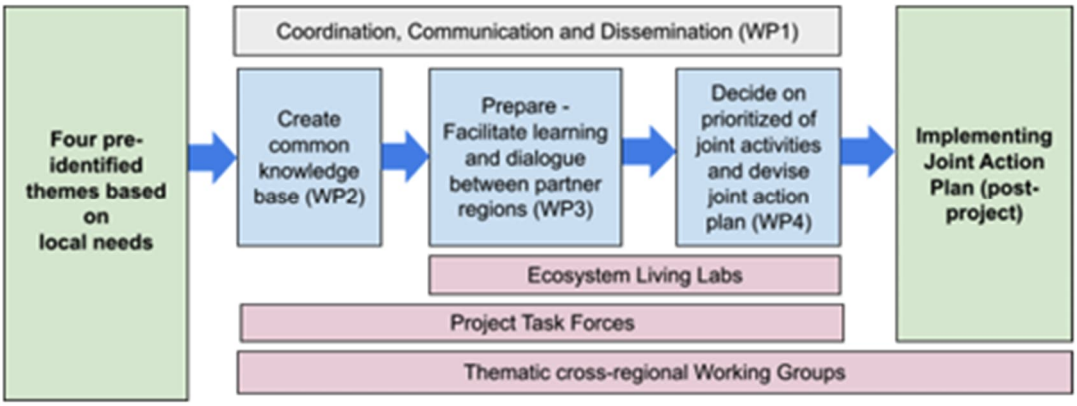


Figure 1. Overview of METACITIES project steps.

2 EXECUTIVE SUMMARY

This report summarizes the activities conducted in Work Package 4 (WP4) of the METACITIES project. The aim of the WP4 was to engage the relevant penta-helix stakeholders, including the decision-makers for regional and BSR-level funding in collaborative prioritisation of action plan items produced in WP3, to transform the opportunities catalogue into a joint action programme agreed by all and with committed funding sources. This entails:

- Devise a Joint Action Plan including all relevant documentation;

- Explore all relevant pathways for the joint action plan implementation funding, including:

- Securing complementary local/regional co-funding commitments, in combination with

- A mapping and assessing of complementary EU- and BSR-level cofunding opportunities, in addition to the preparation of a proposal for the 'HORIZON-EIE-2024-CONNECT-01-01 'Implementing co-funded action plans for connected regional innovation valleys' as a natural complementary cofunding source.

2.1 TASK 4.1: OPPORTUNITIES CATALOGUE ANALYSIS

Building on the METACITIES Opportunities catalogue, a deep impact analysis will be performed by the technical partners. The analysis will assess inter-regional and regional policy fitness and assess regional and inter-regional impact of each opportunity.

2.2 TASK 4.2: PRIORITISING AND SECURING REGIONAL CO-FUNDING

Based on T4.1 output, the local WGs representatives will engage the regional living labs stakeholders for validation and funding sources alignment. First, each regional partner, together with the RRF, ERDF, RIS3 and other national or regional public co-funding authorities explore and define the opportunity space for co-funding. This entails alignment with existing regional and recovery fund strategies, as well as exploring opportunities for new funding allocation. Second, all partners jointly negotiate on the common basis and requirements for the co-funding availability.

2.3 TASK 4.3: DEVISE JOINT ACTION PLAN (JAP) DOCUMENTATION

Once the local and/or regional co-funding commitments are made, the Joint Action Plan will be finalised, taking into consideration the local co-funding commitments made vs proposed items in the METACITIES opportunities catalogue and expected impacts.

2.4 TASK 4.4: MAPPING AND SECURING EUROPEAN CO-FUNDING

In parallel to completing the Joint Action Plan and related documentation, as well as securing the regional funding for its implementation. A proposal for the HEU call 'Implementing co-funded action plans for connected regional innovation valleys' (HORIZON-EIE-2024-CONNECT-01-01) will be prepared. Possible additional and relevant European co-funding sources, such as EU macro- and inter-regional funding (e.g. Interreg BSR and Interreg Europe) as well as EIT Digital programmes, will also be mapped and if applicable targeted.

3 INTRODUCTION TO REGIONS TAKING PART IN JOINT ACTION PLAN

3.1 FINLAND, OULU REGION, OULU

Oulu is situated in North-Finland by the Gulf of Bothnia, at the mouth of Oulu River, which is an ancient trading site. The name 'Oulu' comes from a word in the Sami language meaning floodwater. From a town known for tar and salmon, Oulu has evolved into a growing modern centre of competence. A diverse and international business sector, a strong economy and a cooperative business culture create a foundation for new business activities. The miracle of technology in Oulu means usability. Technology is used to make everyday life easier.

The living environment in Oulu consists of the combination of rural and urban nature as well as the rich urban culture. The strength of Oulu lies in its people. The urban region with more than 250,000 inhabitants represents a unique combination of future skills and willpower on science, culture and technology as well as Finland's youngest population's (39,6 years) courage to create something new. Oulu region is the northern metropolitan area of Finland and the largest centre of the northern regions of Scandinavia.

Oulu is a major ICT hub in North with 1000 ICT companies and over 20 000 ICT professionals working in the region. Oulu is a highly educated city since 1 out of 3 of its residents has a university degree. Actually, number of doctoral students relative share is the highest in Europe. Oulu is also number one in R&D expenditure per capita in Finland.

3.2 ESTONIA, TALLIN

Estonia is the country by the Baltic Sea, which is bordered by the Gulf of Finland from the North, the Baltic Sea from the West, Latvia from the South, and Lake Peipus and Russia from the East. The territory of Estonia consists of the mainland, the larger islands od Saaremaa and Hiiumaa, and over 2,300 other islands and islets on the eastern coast of the Baltic Sea. The total population of Estonia is 1,373,101 as of 2024.

Estonia is a highly urbanised country with more than 70% of the population living in cities and towns. The largest cities in Estonia are Tallinn and Tartu with the population of 457,572 and 97,759 as of 2024. According to the National Study of Shrinking cities, conducted by Estonian Ministry of Economy and Communication, Tallinn University of Technology and SPIN Unit in 2022, most cities and regions in Estonia are shrinking, whereas Tallinn and Tartu cities and regions around them are growing.

Estonia is a pioneer in the field of e-governance. Estonia is the first country in the world to offer e-residency, and 99% of public services in Estonia are available online at any time and from any location, including e-voting. Estonia has a well-developed entrepreneurship and startup culture, and has been testbed for 10 unicorns: Skype, Playtech, Wise, Bolt, Pipedrive, Zego, ID.me, Gelato, Veriff, and Glia. Estonia is promoting CleanTech and GreenTech, as well as DeepTech.

Estonia invests in science and education. To strengthen cross-border and cross-discipline collaboration Estonia supports the establishment of Centres of Excellence, such as FinEst Centre for Smart Cities. Centres of Excellence focus on cutting-edge research in selected areas, and on expanding international collaboration networks through nationally and EU funded projects.

Figure 2. Project Partners in Baltic Sea Region.

3.3 LATVIA, RIGA

Latvia, nestled in Northern Europe along the eastern coast of the Baltic Sea, is a country celebrated for its rich cultural heritage, picturesque landscapes, and unique blend of modern and historic architecture. Its diverse natural scenery includes vast forests, numerous rivers, and over 2,000 lakes, making it a country of remarkable ecological variety and natural beauty.

With a population of approximately 1.9 million people, Latvia is ethnically diverse, with ethnic Latvians comprising around 62% of the population. The country is classified as a high-income nation with a market-based economy. Key sectors driving its economic development include information technology, manufacturing, transportation, and agriculture. Despite recent economic growth, Latvia faces several demographic and social challenges, such as population decline, income inequality, and issues with healthcare accessibility.

Latvia’s strengths are anchored in its strategic location at the crossroads of Northern and Eastern Europe, its highly skilled and multilingual workforce, and its vibrant cultural landscape. Riga, the capital city, serves as the country's economic, political, and cultural center. As a dynamic hub, Riga attracts a growing number of tourists and international investors, contributing significantly to the country's economic activity.

In the context of the MetaCity strategy, which aims to integrate multiple cities and regions into a unified economic and social framework, Latvia plays a pivotal role. Riga, as a central node in this strategy, is vital due to its prominence in transportation, finance, and innovation. Latvia's robust transport networks, advanced digital infrastructure, and strong commitment to sustainability align perfectly with the MetaCity vision. Moreover, Latvia's active participation in regional partnerships and cross-border collaborations enhances its position as a leader in developing a dynamic and interconnected metropolitan area, driving economic growth and improving the overall quality of life for its residents.

3.4 POLAND, WARMIA AND MAZURY REGION

Poland, Republic of Poland, is a country located in Central Europe on the Baltic Sea. It borders with seven countries: Germany in the west, the Czech Republic and Slovakia in the south, Ukraine and Belarus in the east, and Lithuania and Russia (Kaliningrad Oblast) in the north. Poland, with an area of approximately 312,696 km², is the ninth largest country in Europe.

The capital of Poland and its largest city is Warsaw, which is also one of the main economic, cultural and political centers. Other important cities include Kraków, which is the historical and cultural heart of the country, Łódź, Gdańsk, Wrocław, Poznań, Szczecin and Katowice. About 60% of the country's population of about 38 million people lives in cities.

Poland is undergoing dynamic economic and social changes that affect its position in Europe and the world. Recent years have seen significant growth in innovation and technology. Poland is developing dynamically in key technological areas, such as IT and software, FinTech, e-commerce, mobile technologies, artificial intelligence, biotechnology and green technologies. Many Polish cities are trying to develop as "smart cities", investing in modern infrastructure, digital technologies and sustainable development. Warsaw, Wrocław, Kraków and Gdańsk are at the forefront of cities striving to integrate modern technological solutions in urban management and attracting investors and specialists from all over the world. Poland is a leader in IT outsourcing, developing 5G networks and telemedicine.

The MetaCity concept in Poland focuses on creating integrated and intelligent urban spaces that combine economic, social and environmental functions. This strategy includes the development of digital infrastructure, public transport, energy efficiency and data management to improve the quality of life of residents and increase the international competitiveness of cities.

Poland, thanks to its geographical location, rich history and dynamically developing economy, is becoming an increasingly attractive place for investment and the development of innovative urban projects. Striving for MetaCity status is another step towards a future that aims to improve the quality of life of residents and sustainable urban development.

3.5 SWEDEN, REGION NORRBOTTEN, LULEÅ

Norrbotten County is Sweden's northernmost and largest county, both in terms of area and natural diversity. Covering around 98,911 square kilometers, it accounts for approximately one-quarter of Sweden's total land area. The county's capital is Luleå, and other significant cities include Piteå, Boden, Kiruna, and Gällivare.

With a population of about 250,000 (as of 2023), Norrbotten is one of Sweden's most sparsely populated regions. Most of the population lives along the coast, particularly in and around Luleå and Piteå, while the interior and northern parts of the county, such as Kiruna and Jokkmokk, are much less densely populated.

The county encompasses two historical provinces: Norrbotten and Lapland. Norrbotten is characterized by coastal landscapes with vast forests and large rivers like the Lule and Pite rivers. Lapland, covering the western and northwestern parts of the county, is renowned for its mountainous terrain and wilderness, with iconic areas such as Kebnekaise, Sweden's highest peak, and Sarek National Park.

Historically, Norrbotten has been closely tied to the mining and forestry industries. Cities like Kiruna and Gällivare are internationally known for their mining operations, particularly the extraction of iron ore, which has played a central role in Sweden’s industrial development. The mining industry has undergone modernization to meet sustainability goals and reduce environmental impacts.

Luleå, the administrative center of the county, is also a key technological hub. Luleå University of Technology has helped establish the city as a center for technological research, innovation, and IT development. One notable example is Facebook’s data center in Luleå, which takes advantage of the cold climate and renewable energy provided by hydropower.

Tourism is also becoming increasingly important, with visitors drawn to the region for its northern lights, midnight sun, and adventures in the pristine mountain landscapes.

Norrbotten faces challenges such as depopulation and urban migration, with many young people moving to southern Sweden for education and job opportunities. However, efforts are being made to promote sustainable industries, innovation, and infrastructure development to attract new residents and strengthen the regional economy.

4 DEFINITION OF METAVERSE: METACITY - WHY REGIONS SHOULD BE INTERESTED IN IT - NARRATIVE AND ECONOMIC OPPORTUNITIES

4.1 EUROPEAN PERSPECTIVE

In the summer of 2024, the European Union published the initiative of virtual worlds, i.e. metaverse for the development and promotion of technologies in Europe. Metaverse solutions such as for example advanced communication connections (5G/6G), artificial intelligence, IoT and extended reality (XR) solutions, renew various industries, also affecting people's skills, working methods and occupations. The metaverse, or virtual worlds, will thus also come to influence and change the structures of society, whose operation in cities play a significant role. The European Council has urged the European Union to stay at the forefront of metaverse related development and to ensure

and strengthen European countries pioneering and competitiveness in relation to other countries where metaverse development already is well advanced.

There are several European policies completely or partly related to metaverse development in action during program period 2021 – 2027:

4.1.1 EUROPEAN DIGITALIZATION POLICY

The European digitalization policy, often referred to as the "Digital Decade," aims to empower businesses and people in Europe to thrive in a digital future. The policy sets concrete targets and objectives for 2030, guiding Europe's digital transformation across several key areas:

- Skills: The goal is to have at least 20 million ICT specialists and ensure that at least 80% of the population has basic digital skills.
- Digital Transformation of Businesses: The policy aims for 75% of EU companies to use cloud, AI, or big data technologies. It also seeks to double the number of EU unicorns and ensure that more than 90% of SMEs reach at least a basic level of digital intensity.
- Secure and Sustainable Digital Infrastructures: This includes providing gigabit connectivity for everyone, doubling the EU's share in global semiconductor production, and establishing 10,000 climate-neutral, highly secure edge nodes.
- Digitalization of Public Services: The policy aims for 100 % of key public services to be available online, 100 % of citizens to have access to their medical records online, and 100 % of citizens to have access to a digital ID.
- The policy also emphasizes the importance of multi-country projects to achieve these targets, combining investments from the EU budget, member states, and the private sector.

4.1.2 NEIA: NEW EUROPEAN INNOVATIVE ACTIONS

The New European Innovation Agenda, adopted on July 5, 2022, aims to position Europe at the forefront of deep-tech innovation and start-ups. This agenda is designed to address pressing societal challenges such as reducing greenhouse gas emissions, making economies more digital, and ensuring Europe's food, energy, and raw materials security.

The agenda focuses on five flagship areas:

- Funding Scale-Ups: This involves mobilizing institutional and private investors to invest in European deep-tech start-ups, helping them scale up and grow.
- Enabling Innovation through Experimentation Spaces and Public Procurement: This includes creating improved framework conditions for innovation, such as regulatory sandboxes, test beds, and living labs.
- Accelerating and Strengthening Innovation in European Innovation Ecosystems: This aims to support the creation of regional innovation valleys and direct significant funding to interregional innovation projects.
- Fostering, Attracting, and Retaining Talents: This involves initiatives to develop and attract deep-tech talents, including an innovation intern scheme, an EU talent pool, and a women entrepreneurship and leadership scheme.
- Improving Policy Making Tools: This focuses on developing robust, comparable data sets and shared definitions to inform policies at all levels across the EU.

The agenda includes a coherent set of 25 actions to accelerate the development and scaling up of innovation across the Union.

4.1.3 LOCAL DIGITAL TWINS & CITIVERSE

The European Citiverse initiative, also known as the "Local Digital Twins & CitiVERSE" initiative, is a significant project launched by the European Commission. The initiative aims to connect local digital twins created in member cities, fostering data and services interoperability and developing common standards to combat digital fragmentation across the EU.

The initiative is implemented through the European Digital Infrastructure Consortium (EDIC), which was officially announced on February 7, 2024. The founding members of this EDIC include Belgium, Croatia, Czech Republic, Estonia, France, Latvia, Luxembourg, Portugal, Slovakia, Slovenia, and Spain. More member states can join on an ongoing basis. The Citiverse initiative focuses on creating interconnected hybrid and virtual worlds synchronized with physical spaces.

The initiative also emphasizes the importance of multi-country projects, combining investments from the EU budget, member states, and the private sector. This approach will open opportunities for digital SMEs and businesses beyond national borders, allowing cities and regions to choose from the best value for money.

4.1.4 EUROPEAN DATA SPACES

The European Data Spaces initiative is a key component of the European strategy for data, aiming to create a single market for data that freely flows within the European Union. This initiative is designed to make more data available for access and reuse in a trustworthy and secure environment, benefiting European businesses and citizens.

The initiative focuses on several strategic fields, including health, agriculture, manufacturing, energy, mobility, financial services, public administration, and skills. It also includes the European Open Science Cloud and the Green Deal data space, which emphasizes meeting the Green Deal's objectives.

Key features of the Common European Data Spaces include:

- Open Participation: All organizations and individuals can participate.
- Secure Infrastructure: Ensures privacy-preserving infrastructure for pooling, accessing, sharing, processing, and using data.
- Fair Access Rules: Provides a clear and practical structure for accessing and using data with fair, transparent, proportionate, and non-discriminatory access rules.
- Compliance with EU Rules: Adheres to EU rules and values, especially personal data and consumer protection, and competition law.
- Empowerment of Data Holders: Allows data holders to grant access to or share certain personal or non-personal data, either for free or against compensation.

The initiative aims to unleash the potential of data-driven innovation, allowing data from across the EU to be made available and exchanged in a trustworthy and secure manner. This will enhance the development of new data-driven products and services, forming the core of an interconnected and competitive European data economy.

4.1.5 REGIONAL INNOVATION POLICIES; SMART SPECIALIZATION PROGRAM

The Smart Specialization Programs European initiative is a strategic approach to economic development through targeted support for research and innovation. It aims to boost growth and jobs by enabling each region to identify and develop its own competitive advantages. This initiative is a cornerstone of the European Union's cohesion policy and is designed to ensure that innovation does not falter due to a lack of funds or interested markets.

The Smart Specialisation Strategies (S3) help regions to focus on their strengths by targeting research funding at those science and technology areas where local industries, universities, and research centers already have an established lead or strong background. This approach is not just about growth but about turbocharging it, providing a tailored roadmap that helps each EU region figure out what they are good at and then gives them the tools to become the best at it.

The initiative also aligns with transformative innovation policies to address societal challenges and ambitious sustainability goals, such as those outlined in the European Green Deal and the UN 2030 Agenda. It supports regional innovation strategies that boost growth and prosperity while addressing regional imbalances, and it has inspired regions beyond the EU.

4.1.6 EXAMPLE OF NATIONAL POLICY: FINNISH METAVERSE STRATEGY

A Finnish national metaverse strategy was developed for Finland by BusinessFinland coordinated project in 2023. Starting from 2024, the national strategy will be implemented through the Metaverse in Action (MIA) programs. There are five MIA programs: Industry, Health, Society, and the cross-cutting themes of Technological Enablers and Business Networks. BusinessFinland will invest 50 million euros annually over the next ten years in the implementation of the national MIA programs.

4.2 DEFINITION OF METAVERSE

The European Parliamentary Research Service published a report in June 2022 titled "Metaverse: Opportunities, risks and policy implications." The report discusses the opportunities and risks of the metaverse and their impact on policy. According to the report, "The metaverse is an immersive and continuous virtual 3D world where people interact through avatars, engaging in various activities such as leisure, professional and commercial interactions, and even healthcare procedures like surgeries."

According to Finland's national metaverse strategy (Metaverse Initiative by Finnish Ecosystem 2023) metaverse refers to a collective virtual shared space that connects and transcends physical, digital and augmented reality. The metaverse is a combination of virtual and real world (for example digital twins) and is considered the next development stage of the internet. The two key features of the Metaverse are virtuality and immersiveness (immersion means sinking into another reality or environment). It utilizes augmented reality (XR) technologies such as AR (augmented reality), VR (virtual reality), MR (mixed reality), AV (audio visual), 360 video and so on.

Metaverse is often described as a fully realized digital world where users can interact with each other and the environment in real-time, regardless of their physical location. In the metaverse, users can create avatars to represent themselves, explore virtual worlds, engage in social interactions, play games, attend virtual events, conduct business, and even own and trade virtual assets like NFTs (non-fungible tokens). The concept extends beyond a single platform, encompassing a network of interconnected digital spaces where people can seamlessly move and interact across different virtual environments.

According to forecasts, by 2026, 25% of people will spend at least one hour per day in the metaverse, working, shopping, or participating in social activities. The economic ecosystem of the metaverse is expected to be based on blockchains and cryptocurrencies, such as non-fungible tokens (NFTs).

There are very different examples of the beneficial use of the metaverse. Digital twins can be used in teaching to improve the quality of education and the opportunity to learn from mistakes. They can be applied, for example, in the teaching of industrial processes or training nurses in the health sector. Robotics is going to be used in cleaning, guarding, etc. There are numerous applications and their number is growing. Currently, the use is most common in industry. The following growth areas are the healthcare sector and the entertainment industry. For example, in the Oulu area, also security and defense industry are potential growth areas. In Estonia potential growth areas are national and urban digital twins for more efficient design and planning, digital public services, and smart public transport (autonomous vehicles, MaaS, on-demand public transport in rural areas).

It's worthwhile to consider that similarly to Smart City concept, the definition of Metaverse will always be subject to change with the constant evolvement and innovation taking place in urban environment, society and technology it is bound to remain open and destined to keep on changing.

4.3 METAVERSE ECONOMIC OPPORTUNITIES

Metaversum-related business is estimated to grow explosively during next ten years. The yearly growth estimate is from 35 to 48 % between 2022-2030. It is said that the metaverse market will reach approximately 800 billion (USD) by year of 2031 (https://www.skyquestt.com/report/metaverse-market).

In Finland for example according to Business Finland, in 2035 Finland's share of the additional turnover brought by the world's metaverse is € 30 billion. In the Oulu region's ICT cluster there are currently around 300 companies. A significant part of the areas of expertise of the cluster's companies are related to aspects related to the metaverse.

In Poland, the metaverse market is developing dynamically, but is still in its early stages. This is evidenced by the fact that only 11% of Polish consumers know the meaning of the “metaverse” term, while one-third have heard this term before – awareness is only slightly higher amongst teenagers and young people (increases to 39% and 45% respectively) (Poland meets metaverse, March 2023). Despite this, it is predicted that the metaverse market in Poland may reach EUR 10 billion by 2035.

Latvia is well-positioned to benefit from the rapidly growing global metaverse market. The Latvian ICT sector, contributing 4.9% to GDP and employing over 40,000 professionals, is already active in areas like AR/VR, blockchain, and software development. With EU funding and a thriving start-up ecosystem, Latvia could capture a market share of up to €5 billion by 2035, aligning with growth trends in Europe.

The Metaverse market in Sweden is experiencing significant growth, with an expected market volume of USD 35.5 million in 2024 and an annual growth rate (CAGR) of 33.31% until 2030, which will result in a market volume of USD 199.4 million by 2030. This demonstrates a rapidly expanding interest and investment in Metaverse technologies in the country.

5 THE SPECIFIC OBJECTIVES AND KEY PERFORMANCE INDICATORS OF JOINT ACTION PLAN AND HOW WE MET THEM?

In the METACITIES - Connecting Pockets of MetaCity Excellence around the Baltic Sea Region project plan following targets were set to be done in the project.

5.1 SPECIFIC OBJECT (SO) 2 AND IT´S KEY PERFORMANCE INDICATORS

Object: Create a joint action plan for Baltic Sea MetaCity Regions and decide the action plan details in interaction with regional funding decision making.

Result: Common Joint Action Plan with cooperation of participating regions was done. Letter of Intents were collected in interaction with regional funding decision making.

Object: Under WP4, the relevant penta-helix stakeholders as well as local decision-makers in partner regions are engaged in collaborative prioritization of action plan items, to explore best opportunities for the joint action plan implementation funding, via securing regional funding commitments in combination with EU level funding instruments. KPI 3.1 Opportunities (30) for collaboration (project themes, project ideas, other actions) identified and analysed for JAP. Analysis has been done on a regional and cross-regional level. KPI 3.2 Collaboration items (8) agreed upon for the JAP. KPI 3.3 Number of collaborative project ideas (4) for open calls for JAP, agreed upon for the Joint Action Plan.

Result: The penta-helix stakeholders from all the participating regions were engaged in collaborative prioritization of action plan items through opportunities deep impact analyses (appendix 1) and living labs (chapter 9 and appendix 2). Also project themes and project ideas were identified and analyzed and collaboration items agreed in JAP (chapters 7 and 9).

Object: The decisions for inter-regional ambitions are made through joint prioritization of the long list of opportunities and project themes (SO1 outcome), iteratively with aligning these with regional funding opportunities arising from local RRF, ERDF and other cohesion fund alignment, as well as from additional local and European co-funding sources (including national funding, EU macro- and inter-regional funding as well as EIT Digital programmes). KPI 3.4 Regional Funding committed for the Joint Action Plan (LoI): 18 M EUR. KPI 3.5 Complementing private and national Co-Funding committed for JAP implementation: 5 M EUR. KPI 3.6 No. of regions committing regional funding for the JAP: 5 regions.

Result: From opportunities deep impact analysis, the most important opportunities were chosen and aligned with funding opportunities (chapters 8 and 9). Letters of intent were collected for regional, private and national funding for the implementation of JAP. The number of regions committing regional funding was 5.

Object: A proposal for the 'HORIZON-EIE-2024-CONNECT-01-01 ‘implementing co-funded action plans for connected regional innovation valleys' is prepared and submitted (indicatively 25th April 2024).

Result: A proposal for the 'HORIZON-EIE-2024-CONNECT-01-01 was not prepared and submitted, because the time schedule of the Horizon call was not suitable for this project. Instead, other funding sources were mapped and cross regional project ideas identified for future preparation.

5.2 EXPECTED OUTCOMES

Prepare joint long-term programmes and action plans fostering collaboration, common innovation-support activities, and the creation of common knowledge assets among EU, national, regional and/or local level innovation ecosystems, enhancing synergies and complementarities of their programmes and encouraging the alignment of their innovation policies and related policies impacting innovation in line with the NEIA, establishing, if relevant, links to the new Partnerships for Regional Innovation;

Result: Join programs are part of the project ideas. Links to the new Partnerships for Regional Innovations were established through "European Metacities MoU" (appendix 3).

Ensure the inclusion of all key innovation players from across the quadruple helix, and all EU territories, including rural areas.

Result: Inclusion of all key innovation players were ensured through Living Lab and other forums.

Foster synergies with other EU funding programmes, including Cohesion Policy instruments, the Recovery and Resilience Facility, and any other funding leverages, including national or regional public funds, and private funds, to complement Horizon Europe support for innovation ecosystems.

Result: Synergies were sought (chapter 7).

Target Groups: National, regional and/or local authorities together with private actors, including State-owned enterprises, and R&I actors or networks, e.g. the EIT KICs.

Result: Target groups were reached through various activities.

Scope: To prepare joint multi-annual programmes of activities and action plans with the aim of strengthening the performance and capacity of their innovation ecosystems, their efficient interconnection and their alignment towards EU-level priorities, in line with the NEIA, to jointly tackle challenges at EU, national, regional, and local level.

Result: all project ideas and chosen opportunities were reflected towards EU-policies.

5.3 LIST OF MILESTONES

Securing complementary local/regional co-funding commitments: Letter of Intent local/regional co-funding sources is devised, and the decision for LoI is secured.

Milestone reached: 4 Letters of Intent were collected. At the time of submitting this document we are still waiting for a couple more to arrive, delayed due to administrative problems.

Mapping complementary cross-regional co-funding for JAP implementation: Proposal for HORIZON-EIE-2024-CONNECT-01-01 is prepared (or other funding source).

Milestone was not reached: Proposal was not made because of the changed timetable of the call. Other funding sources were sought.

Milestone: JAP implementation launch: Final project event.

Milestone reached: The Final Metacities project event was held on 19th of November 2024 in Helsinki. The event was held in cooperation with The Finnish Metaverse Strategy implementation. The program included Finnish Metaverse Strategy results, Metacities project Joint Action Plan results and project showcases from the University of Oulu and Nokia. During the discussion also the Latvian metaverse ecosystem was presented. There were 58 registered attendees in the event. Participants came from Finland, Sweden, Poland, Great Britain, Denmark, Belgium, Estonia, France, Latvia, USA

and China, so the results of the Metacities project were recognized and disseminated internationally. The location of the event was “Epicenter”, Mikonkatu 7, Helsinki. After the event, during the afternoon, Metacities project had a stand in MatchXR event in Helsinki together with other metaverse related projects. In the stand the results of the project were shared to event visitors.

6 VISIONS AND OBJECTIVES OF COLLABORATIVE REGIONAL METAVERSES

6.1 BUILDING METACITY FOR REGIONAL COLLABORATION - HOW THE COLLABORATION IS ORGANIZED; HOW IT IS INTEGRATED TO PARTNERS’ ACTIVITIES; - HOW IT EXPANDS BEYOND CURRENT CONSORTIUM; - HOW IT IS INTEGRATED TO EIT DIGITAL

6.1.1 OULU REGION

How is the collaboration organized?

Oulu region MetaCity (or metaverse) key actors right now are the University of Oulu, the Oulu University of applied sciences, VTT (National Research Institute), City of Oulu and private companies. In Oulu region the main part of collaboration is organized through Oulun Innovation Alliance co-operation treaty in which the key stakeholders are taking part. Current co-operation will cover years from 2021 to 2027. After this season a new treaty with new goals will be made. One of the spearhead programs of the Oulu Innovation Alliance co-operation treaty is connectivity and metaverse. To continue investing in metaverse theme, topic should be included in the next co-operation treaty for the period 2028 – 2035.

How it expands beyond current consortium?

National collaboration is done via “Innocities” network, which includes 18 university cities of Finland. This collaboration will take place in the years 2021 – 2027. In late 2024 Oulu and fellow cities will start a new “National Metaverse Network” ERDF-project which is used to build a network of Finnish cities in Metaverse theme. Oulu is also actively working with Business Finland and Dimec in MEFI-programs (Metaverse Finland) network, which is mainly targeted to different sized companies in metaverse theme. Business Finland will also target national funding to these programs.

International collaboration is built through established European wide city networks such as Eurocities Digital Forum and Open and Agile Smart Cities. Also, Citiverse is one example of European level initiative which can be used to promote the metaverse theme. International EU-funded co-operation projects like METACITIES are also an important tool now and in the future.

6.1.2 ESTONIA

How is the collaboration organized?

In Estonia, the FinEst Centre for Smart Cities will take a leading role in advancing the MetaCity concept. As a Centre of Excellence, the FinEst Centre is a key expert and advocate of the Smart City framework. The MetaCity concept, which extends the Smart City framework by incorporating

immersive technologies like VR, AR, MR, audio-visual, and 360° video, aligns with the existing expertise of the FinEst Centre. Therefore, the FinEst Centre is well-positioned to naturally evolve into a leading authority and promoter of the MetaCity concept.

The FinEst Centre's primary areas of focus include:

- Research: Conducting advanced studies in Smart City (and MetaCity) definition, regulatory framework, technologies, and methodology;
- Consortium building and EU funding applications: Leading the formation of partnerships and developing applications for European Union funding (Horizon Europe, Digital Europe Programme);
- Smart City Challenge piloting program: Facilitating the development and testing of innovative technologies in collaboration with cities in Estonia and abroad;
- Innovation ecosystem development: Cultivating a DeepTech and cleantech ecosystem that supports startups, scaleups, and SMEs.

How does it expands beyond current consortium?

As a participant in the BSR MetaCity network, the FinEst Centre could serve as a regional contact point for MetaCity activities. Within the BSR MetaCity Innovation Hub, the Centre could spearhead efforts in prototyping and piloting novel technologies, as well as advancing the regional innovation ecosystem. FinEst Centre will contribute to the extension beyond current consortium through its wide network of partner cities in Estonia and abroad, as well as through wide network of partner research, industry and EU level innovation-related organisations.

6.1.3 SWEDEN, REGION NORRBOTTEN, LULEÅ

How is the collaboration organized?

There is no formally established Metacity project at the time. The collaboration is based on a network of initiatives in digitalization, innovation, and regional development.

The collaboration in Norrbotten around digitalization and development is organized through strong networks of the public sector, academia, and industry.

Here are some key players and structures playing important roles in such an effort:

- Luleå University of Technology (LTU) - is a central player in technological development and innovation in Norrbotten. LTU partners with both private companies and public actors to develop digital solutions that could form the foundation for a future "Metacity."

- Collaboration Between Municipalities and Region Norrbotten – they have been driving efforts to promote digital infrastructure and innovative projects to support growth and development in northern Sweden. These regional authorities are essential for implementing smart city solutions, which are prerequisites for a Metacity.

- Innovation Platforms and Business Clusters - Norrbotten has a strong culture of innovation, with several clusters and networks bringing together companies, academia, and the public sector.

- Collaboration with Industry- Norrbotten's major industries, particularly in mining, energy, and technology, are also involved in the region's digitalization journey. Companies like LKAB, Vattenfall, and Boliden work with researchers and technical developers to implement digital solutions within their respective sectors.

- Digitalization of the Public Sector -The digitalization of public services in Norrbotten plays an important role. By providing services digitally through VR or AR, residents in remote areas could access public services and education remotely in virtual environments.

6.1.4 POLAND

How is the collaboration organized?

In Poland, there is no formally established network of cooperation in the MetaCity area. There are various initiatives that are supposed to support the development of cities, at the moment more towards smart city than metaverse. The concept of metaverse is still in the early stages of development.

The activities that are currently being undertaken are primarily aimed at several domains:

- digitization of public services,

- intelligent management systems, e.g. traffic, infrastructure, energy management,

- development of IT infrastructure,

- digital education.

As EdTechHub Accelerator, we support the digital transformation of the public sector. We are part of the Digital Knowledge Observatory Foundation (FDKO), which has been a pioneer in the field of digital transformation since 2005, running a technology cluster, three accelerators and a seed capital fund. We try to connect the public sphere with scientists, business and technology. To develop the MetaCity concept, we take actions to promote it through participation in national and international initiatives.

Cooperation to develop the MetaCity concept should focus on activities aimed at raising awareness, integration and undertaking joint initiatives among the BSR-5 countries. The following activities should be taken:

- creating a common definition of metaverse and metacity and activities to disseminate the idea among various stakeholders - information campaigns, workshops, conferences, working groups,

- defined common goals in the development of the concept - goals should be locally relevant,

- involvement of specific stakeholders from the local level,

- undertaking joint project activities - activities aimed at obtaining funds and cooperation.

6.1.5 LATVIA

How is the collaboration organized?

Latvia envisions its role in the MetaCity initiative as a vital contributor to regional collaboration, leveraging its strategic location in the Baltic Sea Region and its growing technological capabilities. The objective is to position Latvia as an active partner in developing and implementing the MetaCity concept, ensuring that regional collaboration drives innovation, inclusivity, and sustainability.

Collaboration is embedded into existing projects and priorities of Latvian stakeholders. For instance, academic institutions provide research and innovation capabilities, while industries, such as ICT companies and startups, contribute technological expertise. Government bodies align MetaCity activities with regional development strategies, like RIS3 and ERDF, ensuring policy support and funding alignment. This integration ensures that MetaCity initiatives complement and enhance partners' ongoing objectives.

HOW DOES IT EXPANDS BEYOND THE CURRENT CONSORTIUM?

Expansion beyond the current consortium is achieved by engaging additional regions, sectors, and international partners. Latvia focuses on building broader networks through events like the 5G Techritory forum, establishing partnerships within the Baltic Sea Region, and involving underrepresented groups. This approach seeks to attract new expertise, share best practices, and secure funding, creating a comprehensive and inclusive MetaCity ecosystem.

6.1.6 CONCLUSIONS AND HOW IT IS INTEGRATED TO PARTNERS' ACTIVITIES AND HOW IT IS INTEGRATED TO EIT DIGITAL?

Overall, the MetaCity collaboration is organized through regional alliances, national networks, and international partnerships, integrating with partners' activities, and expanding through established networks and new projects. The collaboration aims to promote the metaverse theme and secure funding for future initiatives.

To integrate activities of different partners and EIT Digital following actions should be done in every region:

0 All the partnering regions need a torchbearer organization(s) for Metacity theme.

1 All the partnering regions need to have a common definition of developing theme, in this case MetaCity (metaverse).

2 All the partnering regions need to do technical readiness or technical maturity assessment of regions/ecosystems. This is done to see if it´s possible to regions to do cooperation.

3 All the regions need mapping of key stakeholders in their own region.

4 All the regions need to do mapping of their activities considering metaverse: is there a local strategy or program considering MetaCity (or metaverse or related subject)?

5 All the regions need assurance of resources by gathering consortiums to EU-calls and resources for writing applications.

6 Disseminating information in EU-level networks like Eurocities Digital Forum, Open and Agile Smart Cities network and Living-in.eu network is important.

6.2 LONG-TERM VISION FOR METACITY REGIONS - SCENARIOS AND PROJECT PORTFOLIOS - SUPPORT FOR STARTUPS AND SCALEUPS; - BRINGING IN BEST INTERNATIONAL EXPERIENCE; - TEST BEDS AND LIVING LABS;- SKILLS AND TRAINING OF ALL STAKEHOLDERS;- DEMONSTRATIONS (PRE-COMMERCIAL AND COMMERCIAL)

6.2.1 OULU

Scenarios

Oulu Region vision as a Metacity region and for the metaverse is defined in Oulu Innovation Alliance cooperation treaty and through various regional projects related to metaverse theme. The vision of Oulu Innovation alliance is to make the Oulu region the best European ecosystem to create global added value with digitalisation, solving ecological, economic, and social sustainability challenges through northern innovations. The OIA aims to achieve this vision through several strategic objectives. One of these is “Digitalisation in the changing urban environment” with “Metacity and future information networks spearhead”. MetaCity is a leap to a novel generation of smart city concept to accelerate the evolution of digital and virtual city services and governance to the next level of the post-pandemic era, after the transition to virtual cooperation. The cornerstones of MetaCity are in high technology but the strong focus of co-innovation is in the services. 6G Metaverse: The alliance envisions Oulu as a leading hub for the development and implementation of 6G technologies and the metaverse. This includes creating a top-of-the-line environment for vertical solution productization, involving real traffic, real people, and real solutions. The Oulu Innovation Alliance “Future Information Networks and Metacity” spearhead program implementation plan for the coming years states it´s goal:

“By 2027, the Oulu region is globally recognized as a hub for Metacity activities, creating impactful research and business, and promoting sustainable development.

1. We have created a unique dynamic ecosystem of expertise, where the knowledge of the private and public sectors combines to develop and commercialize innovative Metacity solutions. 2. This ecosystem has produced widely used services for selected industries that support the well-being of the region. 3. Thanks to the OIA Regional Metaverse Program being done, there are sustainable frameworks for expanding Metacity solutions to international markets.

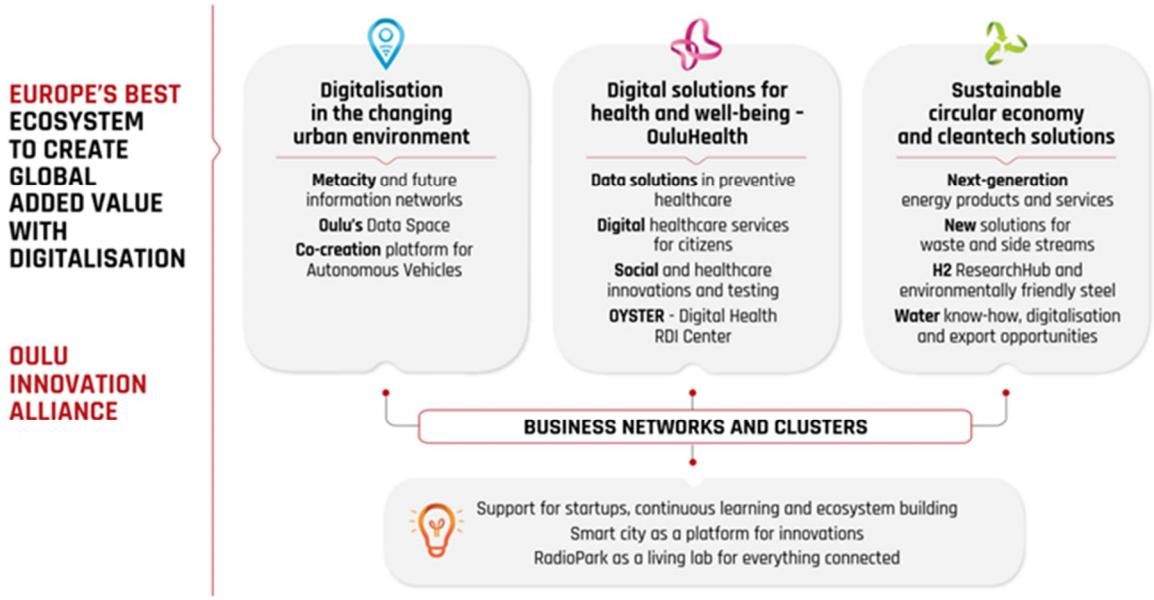


Figure 3. Oulu Innovation Alliance strategy 2021-2027.

Project portfolio

Oulu region MetaCity (or metaverse) project portfolio at the moment includes 8,5 M euros of projects. Key actors owning the projects are the University of Oulu, the Oulu University of applied sciences, VTT (National Research Institute), City of Oulu and private companies.

Support for startups and scaleups

The Oulu region offers robust support for startups and scaleups through various initiatives and programs.

- Oulu Innovation Alliance: This program period from 2021 to 2027 focuses on rebuilding and strengthening the startup ecosystem. It includes several joint projects with its partners.
- Proof of Concept (PoC) Funding: The City of Oulu finances PoC activities for three years (2023–2025) at the University of Oulu, Oulu University of Applied Sciences, and OSAO. This funding supports innovative experimentation by covering 50% of the costs, with the remaining 50% covered by local universities and vocational schools.
- Startup Ecosystem: Oulu has a dynamic startup ecosystem supported by BusinessOulu, the University of Oulu, the University of Applied Sciences of Oulu, OuluHealth, and other clusters. The ecosystem includes hundreds of startups with significant growth in the number of registered startups in recent years.
- Incubator such as OYSTER Incubator: OuluHealth has launched the OYSTER Incubator for HealthTech startups, providing a platform for aspiring entrepreneurs to develop their ideas and grow their businesses. Oulu´s newly build "Future Hospital" offers 5G capabilities for metaverse development in health sector.
- International Collaboration: Oulu is actively involved in international networks and projects.

These initiatives highlight Oulu's commitment to fostering a vibrant startup and scaleup ecosystem, providing resources, funding, and collaboration opportunities to drive innovation and growth.

Oulu TestBeds and Living Labs

Oulu offers a variety of testbeds and living labs that provide opportunities for companies and researchers to test and develop their products and services in real-world environments. Selection of the TestBeds for trialing include smart building, healthcare, logistics, manufacturing, sustainability and learning innovations in Oulu: BusinessAsema Smart Building, OYS Testlab – hospital environment, OAMK SimLab – simulated service environment, MittLab – medical imaging, Oulu WelfareLab – social and healthcare, OuluZone+ for autonomous vehicles, 5G enabled research and training center, Urban Air Mobility Oulu, Ruskonniitty Centre for Circular Economy, Port of Oulu - port digitalization, PrintoCent - printed electronics innovations, Smart Campus Oulu (Universities area in Linnanmaa), Oulu Primary Schools, FabLab – FabCity. The newest Testbed is developed together with OIA partners, the city and Oulun Vesi (Oulu's Water), University of Oulu and VTT to develop digital wastewater sensoring. The so-called water test bed is also a use case for Oulu Data Space. Oulu stakeholders are actively built or are building metaverse capabilities to different testbeds.

Skills and training of all stakeholders;- demonstrations (pre-commercial and commercial) are done using ongoing and future Metacity/metaverse projects.

6.2.2 NORRBOTTEN

Luleå University of Technology (LTU) plays a key role in Norrbotten's vision for MetaCity, acting as a hub for technological development and innovation. LTU partners with various public and pivate stakeholders to develop digital solutions, forming the foundation for future MetaCity initiatives. This collaboration supports startups and scaleups, offering a conducive environment for testing and scaling technologies. By leveraging cutting-edge research in areas like 5G and 6G, LTU aims to create test beds that facilitate experimentation and development.

Based on our Living Lab (LL) experience and ongoing dialogue with stakeholders, Norrbotten focuses on supporting startups and scaleups through innovation platforms such as Luleå Science Park and Boden Business Park. These platforms serve as incubators, providing resources, networking opportunities, and access to best international practices. The goal is to foster an ecosystem that attracts global talent and investment while promoting the growth of local businesses. Engaging with stakeholders has revealed the need to communicate the MetaCity concept effectively to ensure consistent understanding and involvement across the region, especially among smaller municipalities and the public.

Incorporating best international experience is key to Norrbotten's strategy. By integrating global knowledge and practices into regional projects, the region aims to enhance its competitive edge. Collaborations with international partners bring diverse perspectives and advanced solutions that can be adapted to local needs, thus accelerating the development of MetaCity.

Test beds and living labs are crucial components of Norrbotten's vision. Initiatives like the 5G test bed in Norrbotten provide a platform for businesses and researchers to test next-generation mobile technologies in real-world scenarios. These test beds are instrumental for applications such as telemedicine, autonomous vehicles, and smart energy systems. Through these initiatives, startups can validate their solutions and bring them to market faster, ensuring that innovative ideas are effectively translated into practical applications.

Skills and training for all stakeholders are essential for the successful implementation of MetaCity projects. Norrbotten emphasizes capacity building by engaging educational institutions like LTU to offer training programs and workshops. These efforts focus on equipping stakeholders with the necessary skills to leverage innovative technologies and participate actively in the MetaCity

ecosystem. The dialogue with stakeholders highlighted the importance of continuous skill development to keep pace with rapid technological advancements and ensure broad-based participation in MetaCity initiatives.

For demonstrations, both pre-commercial and commercial, Norrbotten provides a collaborative environment where innovations can be piloted and showcased. Companies such as LKAB and Vattenfall are working with researchers and technical developers to implement digital solutions in sectors like mining and energy. These collaborations offer valuable opportunities to demonstrate the potential of MetaCity technologies, facilitating knowledge transfer and promoting widespread adoption.

In summary, Norrbotten's long-term vision for MetaCity Regions includes robust support for startups and scaleups, integrating best international experience, and establishing test beds and living labs. The region emphasizes skills and training for stakeholders to ensure successful implementation and is dedicated to providing platforms for both pre-commercial and commercial demonstrations. This vision is informed by ongoing dialogue with stakeholders and the practical insights gained from our living lab experience, helping to shape a collaborative and innovative MetaCity ecosystem in Norrbotten.

6.2.3 ESTONIA

Long-term MetaCities Vision for Estonia

Estonia's vision for MetaCities can draw inspiration from the Oulu region's approach, integrating its own strengths in digital transformation, e-governance, and innovation ecosystems. As a forward-looking nation known for pioneering digital governance, Estonia could establish itself as a leading MetaCity region in Europe. By fostering collaboration, innovation, and technology-driven solutions, Estonia can leverage the metaverse to address economic, ecological, and social challenges while creating global value.

Vision Statement

To position Estonia as a frontrunner in MetaCities and the metaverse, the country aims to harness cutting-edge technologies such as 6G, AI, and blockchain to transform urban environments. Estonia's MetaCity initiative will serve as a catalyst for developing inclusive, sustainable, and efficient cities that integrate physical and virtual realities. By fostering collaboration across public and private sectors, and engaging international expertise, Estonia will set the standard for MetaCity governance, innovation, and citizen-centric services.

Scenarios

Estonia's MetaCity vision will be guided by comprehensive long-term programs and action plans. These will align with EU policies and foster collaboration between cities, research institutions, and the private sector to drive innovation and sustainability.

Expected Outcomes

1. Innovation Ecosystems: Establish Estonia as a hub for digital innovation and virtual urban solutions, enabling collaboration across regions and countries.

2. Sustainability: Use MetaCity technologies to address climate challenges and improve resource efficiency, leveraging Estonia's green tech expertise.

3. Citizen Engagement: Build virtual platforms that enhance participatory governance, bridging citizens with decision-makers in real-time.

4. Global Leadership: Promote Estonia as a testing ground for emerging technologies like 6G, AI, and immersive metaverse applications, attracting global talent and investments.

Project Portfolio

Estonia's MetaCity project portfolio could include multi-stakeholder programs focusing on technological development, innovation support, and citizen engagement, akin to Oulu's initiatives. Key actors would involve the Ministry of Economic Affairs and Communications, Estonian Research Council, universities, startups, and city governments.

1. Funding and Collaboration: Establish a national MetaCity fund, co-financed by the EU, private investors, and Estonian institutions, to finance cutting-edge research and development projects.

2. Flagship Projects:

- Digital twin initiatives for urban planning and climate resilience.
- Piloting 6G-enabled services in sectors like healthcare, transportation, and education.
- Virtual reality hubs for tourism and culture.

Support for Startups and Scaleups

Estonia's MetaCity vision will emphasize the development of a robust startup and scaleup ecosystem:

1. Innovation Networks: Collaborate with initiatives such as Startup Estonia and Tallinn Science Park Tehnopol to foster the growth of tech startups.

2. Proof of Concept (PoC) Programs: Introduce funding for experimentation in metaverse applications, covering 50% of project costs with matching contributions from research institutions and private sector players.

3. Incubators: Create thematic incubators focusing on MetaCity solutions in areas like HealthTech, EdTech, and FinTech.

4. International Expertise: Establish partnerships with MetaCity pioneers in Finland, Germany, and beyond, to bring global knowledge and best practices to Estonia.

Testbeds and Living Labs

To accelerate the development and deployment of MetaCity technologies, Estonia will create testbeds and living labs in key urban centers such as Tallinn, Tartu, and Pärnu. These environments will allow companies, researchers, and policymakers to collaborate on real-world solutions. Examples include:

- Smart Mobility Testbeds: Testing autonomous transportation systems.
- Virtual Governance Labs: Exploring immersive tools for citizen engagement and decision-making.

• HealthTech Living Labs: Piloting virtual healthcare solutions in collaboration with hospitals and startups.

Skills and Training for Stakeholders

MetaCity success requires equipping stakeholders with the skills to develop and manage advanced digital ecosystems:

1. Education and Upskilling:

• Collaborate with universities and vocational schools to offer specialized courses in metaverse technologies.

• Organize training programs for city officials on MetaCity governance and digital transformation.

2. Public Awareness Campaigns: Increase public understanding of the benefits and opportunities of MetaCities to ensure inclusive participation.

Demonstrations (Pre-commercial and Commercial)

Estonia will prioritize demonstrations of MetaCity applications to showcase their potential for scalability and commercialization:

1. Pre-commercial Demonstrations: Pilot projects in virtual city services, immersive e-governance platforms, and sustainable urban planning tools.

2. Commercial Deployments: Launch fully operational MetaCity services, such as virtual marketplaces for tourism and advanced urban logistics platforms powered by 6G.

Estonia's Commitment to MetaCities

By combining its expertise in digital innovation with the MetaCity framework, Estonia will create a collaborative, future-ready urban environment. Through long-term programs and action plans, Estonia aims to position itself as a leader in the EU's digital transformation while fostering a sustainable, citizen-centric, and globally connected ecosystem.

6.2.4 POLAND

Edtechhub Accelerator plays an important role in the long-term vision of the development of the metacity concept, both in the Warmia-Masuria region and nationwide. Edtechhub Accelerator is a technological entity focused on solving problems of the digital transformation of the public sector and specializing in supporting startups, especially at the stage of verifying the business viability of the idea and the early development phase.

Edtechhub Accelerator has established numerous private and public-private partnerships, as well as valuable cooperation. For years, it has been supporting the public administration sector and using the experience gained gurin the implementation of the projects in the area of bringing the technological innovations in the public sector.

Edtechhub Accelerator participated in the work of the SmartCityTech cluster within the eT4S project - European Technology for Sustainable Development. Within this project, the cluster agreement supports the possibilities of expansion into international markets interesting Smart City projects. In

addition, it is an active member of EIT Digital (European Institute of Innovation & Technology), which develops Digital Cities issues as part of the Innovation Factory.

Edtechhub Accelerator offers a friendly environment for the development of the smartcity concept towards metacity. We assume the development of concepts and participation in initiatives that bring our region closer to technological innovations in this area.

Currently, in Edtechhub Accelerator, we participate in local projects supporting startup platforms. In addition, we work in agreement with the Digital Knowledge Observatory Foundation, which participates in the project FINEST SCALEUP - Elevating the scalability potential of EU Smart Cities' business for green and sustainable deep tech-based solutions. What is more, Edtechhub Accelerator is a member of WaMa Innovation Hub (WAMA EDIH) operating in Poland, which provides services in the one-stop-shop model for SMEs in the field of digital transformation. The project focuses on four main objectives:

- stimulating the growth of digital maturity for SMEs especially from the Robotics, EdTech, Smart City, IoT and AgriTech sectors,
- creating an ecosystem of European digital innovations through cooperation with other EDIHs, Enterprise Europe Network nodes, clusters, organizations supporting innovative entrepreneurship and local authorities, as well as by associating cooperation between companies,
- increasing the maturity of the market, increasing the potential of the market and sectors to be innovative through actions improving the level of use of European funds and all available financial instruments,
- raising the awareness of SME sector regarding the twin transition.

Edtechhub Accelerator has also been engaged to implement a new project - EIT ACCENT Startup Europe.

The Edtechhub Accelerator supports startups and scaleups through the following activities:

- advisory and expert support – the Accelerator has a group of mentors of 30 experts with various specializations, involved at various levels of projects

- participation in international projects – for example, the FINEST SCALEUP project, which focuses on strengthening investor activities in emerging innovation ecosystems, including Poland,

- support offered as part of national programs – Edtechhub Accelerator participates in the startup platform project as an expert and VC fund,

- providing the assistance in preparing commercialization plans for R&D projects.

Considering the information above, the Edtechhub Accelerator supports startups and scaleups at various stages of their development in various dimensions – both local, national and regional, international.

The Edtechhub Accelerator is open to activities in the field of organizing living labs and conducting test beds. Its experience gained during previous initiatives allows for the effective implementation of these activities.

In addition, Edtechhb Accelerator as part of its activities plans to develop a knowledge base related to understanding metacity within the local ecosystem. A common and clear understanding of the idea and goals is the starting point for building a sustainable, long-term development strategy. It is planned to achieve this goal through webinars, information sessions, dialogue with stakeholders and appropriately constructed information activities.

6.2.5 LATVIA

Latvia is actively working towards establishing a cohesive framework for MetaCity development by aligning its regional strategies with broader EU goals. While a dedicated MetaCity action plan is in development, Latvia has already integrated MetaCity-related objectives into its Regional Innovation Strategies (RIS3) and national digitalization programs. The expected outcome is to create a long-term collaboration platform that supports innovation, fosters the development of smart city solutions, and enhances cross-border regional integration.

The 5G Techritory Ecosystem provides a robust foundation to accelerate the development of Latvia's Metaverse Strategy and MetaCity Vision by offering an integrated framework for innovation, collaboration, and real-world experimentation. By aligning its cutting-edge initiatives with Latvia's long-term goals, the ecosystem creates synergies that empower the nation to become a leader in digital transformation. Here's how the 5G Techritory ecosystem supports the development of Latvia's Metaverse Strategy:

1. Innovation Framework and Strategic Alignment

The 5G Techritory Forum acts as a central hub for discussions and knowledge exchange, connecting key stakeholders in the Baltic, Nordic, and European regions. This aligns perfectly with Latvia's MetaCity goals of fostering collaboration across academia, industry, government, and civil society. By leveraging the forum's network, Latvia can integrate MetaCity-related objectives with broader EU initiatives, ensuring that its regional strategies (e.g., RIS3 and digitalization programs) align with the latest technological trends.

2. Digital Twin and MetaCity Development

The Metacity/Digital Twins initiative within the ecosystem provides a technological foundation for creating virtual urban environments that simulate real-world dynamics. These digital twins are critical for developing smart city solutions, enabling Latvia to optimize urban planning, sustainability efforts, and public services. By integrating 5G connectivity, these solutions can operate in real time, making them more efficient and scalable.

3. Testbeds and Living Labs for Experimentation

The Connectivity Testbeds and Living Labs (e.g., in Riga and Kuldīga) within the ecosystem serve as platforms for testing and refining MetaCity and metaverse solutions. These testbeds enable stakeholders to co-create and experiment with technologies such as augmented reality (AR), virtual reality (VR), and 6G applications in real-world settings. For example: Military, Mobility, and Port Testbeds can explore metaverse solutions for logistics, transport, and smart ports. Open RAN Laboratories ensure interoperability and open access to telecommunications innovations, crucial for large-scale metaverse deployments.

4. Strengthening International Collaboration

The European Partnership Memorandum of Understanding (MoU) signed at the Techritory Forum 2024 formalizes Latvia's collaboration with EU partners, providing access to expertise, funding, and shared knowledge. Additionally, initiatives like Ukraine & Moldova Cooperation and partnerships with the UK DSIT create opportunities for cross-border metaverse projects. These partnerships ensure that Latvia's MetaCity development benefits from global best practices and cutting-edge technologies.

5. Enabling Technologies for the Metaverse

Key technological initiatives within the ecosystem directly support metaverse infrastructure:

6G SNS-ICE ensures that Latvia stays at the forefront of next-generation connectivity, which is vital for high-bandwidth and low-latency applications in the metaverse.

Quantum Technologies Alliance explores breakthroughs in secure and efficient communication, critical for the data-heavy demands of metaverse environments.

The Microchip Initiative strengthens the local semiconductor ecosystem, a key enabler for hardware and devices required in the metaverse.

6. Upskilling and Public Awareness

Through hackathons, workshops, and training programs, the 5G Techritory ecosystem prioritizes stakeholder upskilling and public education. This ensures broad-based participation in MetaCity and metaverse development, empowering Latvian citizens and organizations to adopt and innovate with cutting-edge digital tools.

7. Driving Adoption and Investment

Pre-commercial and commercial demonstrations facilitated by the 5G Techritory ecosystem highlight the practical applications of metaverse technologies in urban settings. These demonstrations attract investment and promote widespread adoption, further accelerating the growth of Latvia's MetaCity regions.

The synergy between the 5G Techritory Ecosystem and Latvia's Metaverse Strategy lies in their shared commitment to innovation, collaboration, and real-world impact. By leveraging the ecosystem's advanced technological initiatives, international partnerships, and testbed infrastructure, Latvia can position itself as a leader in the development of interconnected and sustainable MetaCity regions. This vision not only enhances regional integration but also ensures that Latvia remains at the forefront of the global metaverse and smart city transformation.

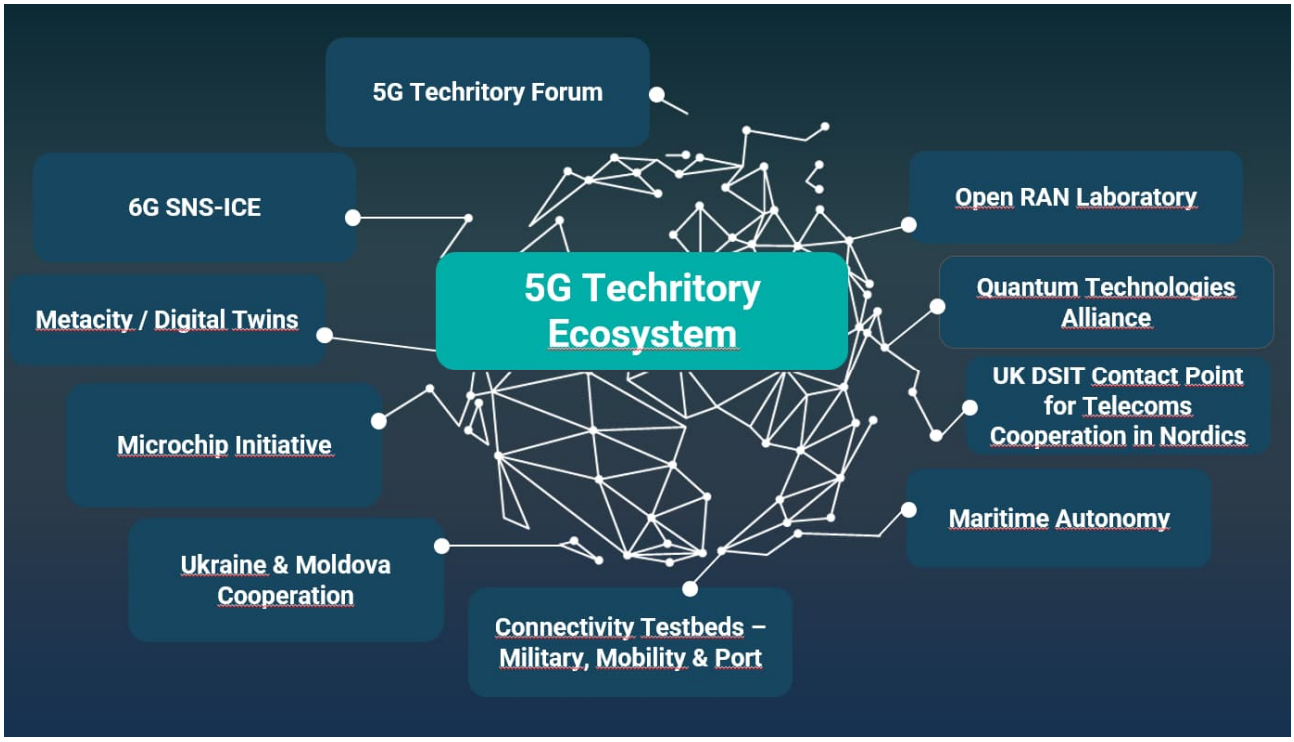


Figure 4. Latvian metaverse ecosystem.

6.2.6 CONCLUSIONS

The long-term vision for MetaCity regions includes strong support for startups and scaleups, integration of international best practices, establishment of test beds and living labs, comprehensive

skills and training programs for stakeholders, and platforms for both pre-commercial and commercial demonstrations. This vision is informed by ongoing dialogue with stakeholders and practical insights from living lab experiences, aiming to create a collaborative and innovative MetaCity ecosystem. Here are the main activities and initiatives mentioned for all regions:

1 Vision and Strategic Objectives: Each region aims to position itself as a leader in MetaCity and metaverse development, leveraging cutting-edge technologies such as 6G, AI, and blockchain to transform urban environments and address economic, ecological, and social challenges.

2 Support for Startups and Scaleups: Robust support systems are in place for startups and scaleups, including innovation platforms, incubators, Proof of Concept (PoC) funding, and dynamic startup ecosystems. These initiatives provide resources, networking opportunities, and access to best international practices to foster growth and innovation.

3 Testbeds and Living Labs: Testbeds and living labs are crucial components, providing platforms for companies and researchers to test and develop products and services in real-world environments. These environments facilitate experimentation and development in areas such as smart building, healthcare, logistics, manufacturing, sustainability, and learning innovations.

4 International Collaboration: Active involvement in international networks and projects is emphasized, incorporating best international experience and fostering global collaboration for innovation and growth. Partnerships with international stakeholders bring diverse perspectives and advanced solutions that can be adapted to local needs.

5 Skills and Training: Continuous skill development is highlighted, with educational institutions offering training programs and workshops to equip stakeholders with the necessary skills to leverage new technologies and participate actively in the MetaCity ecosystem. Public awareness campaigns and upskilling initiatives ensure broad-based participation and understanding of MetaCity and metaverse development.

6 Demonstrations: Both pre-commercial and commercial demonstrations are prioritized to showcase the potential of MetaCity technologies and facilitate knowledge transfer. These demonstrations attract investment and promote widespread adoption, further accelerating the growth of MetaCity regions.

7 METACITIES ALIGNMENT WITH FUNDING SOURCES AND SPEARHEADS PROJECTS: FOUR LARGE-SCALE INTER-REGIONAL PILOTS;- RATIONALE AND IMPACT OPPORTUNITIES; - PROJECTS/THEMES DESCRIBED IN AN ERDF/RRF-FIT FORMAT

7.1 EXAMPLE OF ALIGNMENT WITH FUNDING SOURCES

During the project local RRF, ERDF and other cohesion funding possibilities were studied in order to secure future resources to metaverse development. Also local and European co-funding sources (including national funding, EU macro- and inter-regional funding as well as EIT Digital programmes) were studied.

Regional Funding possibilities in Finland include

- AKKE - funding for supporting the sustainable growth and vitality of regions

- Sustainable Urban Development ERDF in Oulu region is partly aimed for metaverse development, since it´s part of local Ecosystem treaty and Oulu Innovation Alliance activities.
- Regional ERDF
- Regional ESR+
- Regional JTF

National Funding possibilities in Finland include

- National ERDF
- National ESR+
- BusinessFinland, Finnish National Metaverse strategy, Metaverse in Action Programmes
- BusinessFinland, Funding for leading companies and ecosystems
- RRF – not active

European Funding possibilities used in Finland are

- Interreg programmes
- Horizon Europe
- Regional Innovation Valleys (RIV)
- DataSpaces4SSCC preparatory action
- Urban Innovative Actions (UIA)
- The Digital Europe Programme

Oulu Region Funding committed for the Joint Action Plan (KPI 3.4) and KPI 3.5. is as follows:

Oulu Region metaverse consortia has been very active in recent years to apply funding for development. Before year 2025 Oulu Region has been able to commit 3,5 M euros (external funding, public funding and private funding) to metaverse related projects. For the years 2025-2027 this commitment is 5,8 M euros, 4 M euros coming from external sources like National SUD ERDF, JTF, BusinessFinland and DS4SSCC preparatory action (application phase) and 1,8 M euros coming as partners own funding.

Examples of Funding possibilities used in Poland

Edtechhub Accelerator has made a preliminary analysis of financing possibilities for future initiatives. Local and European sources have been checked.

In terms of local financing, support can be distinguished within:

- Warmia-Masuria Regional Development Agency (WMARR),
- local funds from local government units of the Warmia-Masuria Province.

In terms of national financing, support can be distinguished within:

- support from the National Centre for Research and Development (NCBR),
- support within the European Funds for Eastern Poland (FEPW),
- financing within the European Funds for Modern Economy (FENG),
- financing within the European Funds for Digital Development (FERC).

In terms of European financing, support can be distinguished within:

- Interreg programmes,
- Horizon Europe,
- The Digital Europe Programme (DIGITAL).

Funds from private entities and business partners can also be distinguished, depending on the initiative.

Examples of funding possibilities in Latvia include

By leveraging both regional and national funding possibilities, Latvia can integrate its MetaCity and metaverse strategies into a cohesive framework. EU instruments like ERDF, RRF, and Horizon Europe offer large-scale support, while national programs such as those by Investment and DevelopmentLIAA, ALTUM ensure localized innovation and implementation. Together, these funding mechanisms enable Latvia to create sustainable, innovative, and interconnected MetaCity regions.

Regional funding possibilities in Latvia include:

- Riga Municipality
- Kuldiga Municipality

National funding possibilities in Latvia include:

- Investment and Development Agency of Latvia (LIAA)
- Education and Science Ministry of Latvia
- Environment Protection and Smart Administration Ministry of Latvia
- JSC Development Finance Institution ALTUM
- Digital Accelerator of Latvia

European Funding possibilities include:

- Horizon Europe
- Interreg programmes
- Regional Innovation Valleys (RIV)
- The Digital Europe Programme (DIGITAL)

Example of Funding possibilities Norrbotten, Sweden include:

Luleå University of Technology has made a preliminary analysis of financing possibilities for future initiatives. Regional, National and European sources have been checked.

Regional Funding possibilities in Norrbotten include:

- *Region Norrbotten*

National Funding possibilities in Sweden include:

- National ERDF
- Vinnova
- Vetenskapsrådet
- Formas

European Funding possibilities used in Sweden are:

- Interreg programmes
- Horizon Europe
- Regional Innovation Valleys (RIV)
- DataSpaces4SSCC preparatory action
- Urban Innovative Actions (UIA)

7.2 SPEARHEAD PROJECTS

Following spearhead projects were selected for inter-regional pilot projects (KPI 3.3 Number of collaborative project ideas for open calls for JAP agreed upon for the Joint Action Plan). The project ideas chosen, reflect the results of the Joint Action Plan. The first project idea "Connected Regional Innovation Valley for MetaCity Innovations is focused on the interregional ecosystem building through hubs of metaverse excellences. The second project idea focuses on involving the startups to the ecosystems. The third project idea is more "hands on" approach and bringing metaverse closer to people with game hubs. The Fourth idea focuses on developing Metacity/metaverse assessment tool in order to bring regions on the same level defining metaverse.

7.2.1 PROJECT 1 CONNECTED REGIONAL INNOVATION VALLEY FOR METACITY INNOVATIONS

Leveraging from the learnings of the MetaCity preparatory project (Horizon-EIE-2023-CONNECT-01-02). The project identified 40 (26 in opportunities catalogue and 14 in WP4 living labs) collaboration opportunities for the Baltic Sea Region from which 8 proposals will be selected for Joint Action Plan. Through the groundwork conducted in MetaCity preparatory action project the current aim is to position the EU BSR area as the World's leading "Connected Regional Innovation Valley" for MetaCity innovations.

The European Challenge: Europe smart cities aim to achieve climate neutrality by 2030. A key feature in Europe's approach is a strong focus on community engagement, inclusiveness and collaboration across different stakeholders including municipalities, businesses, universities and citizens. The Challenge Europe is facing is to scale its decentralized, collaborative smart city approach while maintaining global competitiveness. To do so, European cities are emphasizing long-term sustainability, inclusive urban design, and citizen-led innovation (The State of European Smart Cities). This is the core challenge that MetaCity is solving with borderless European MetaCity innovation ecosystem.

The Future Economic Potential is Significant. The global economic opportunity for leading MetaCity regions is vast. A study commissioned by the Latvian government and conducted by Cambridge Judge Business School in September 2022 projects that the total market value of the Metaverse by 2030 will range between €550 billion and €1.4 trillion. The Metaverse market is expected to experience rapid growth, and many MetaCities are supported by national governments. Riga has the potential to become a leading MetaCity within the EU, while Tallinn holds a strong competitive advantage.

The opportunity is evident within the partner ecosystems. For example, the Latvian MetaCity study identified nine large corporations, three of which are already engaged in the MetaCity project, alongside 10 specialized technology companies (three already involved) and seven relevant R&D entities (four already engaged). In Oulu, a 2022 MetaCity ecosystem study revealed 21 existing research infrastructures from three universities that align with the MetaCity domain. Also Finland's metaverse strategy and the goals to create smart, interconnected urban spaces that advance digital services, virtual environments and Living Labs for real-world expermentation aligns with the opportunity space. Additionally, Estonia and Norrbotten are focused on strengthening Smart Cities and Living Labs through the MetaCity approach. Meanwhile, the Warmia and Masuria region, characterized by limited innovation resources according to its RIS3 strategy, is aiming to boost ICT and innovation funding, aligning its efforts with societal transformation and broader target groups in traditional industries.

Designed to advance the digital and green transitions, our project empowers MetaCity SMEs, Startups and scaleups to utilize metaverse capabilities. The Mission: Joint MetaCity regional ambitions and capabilities to improve living and economics with digital innovations.

Key objectives: Strengthen Regional Innovation Ecosystems by establishing interregional partnerships to co-plan and co-implement innovation strategies that integrate less-represented regions into broader EU networks. Promote Cross-Border Collaboration Connect advanced and emerging innovations within MetaCity context through structured networks to increase the scalability and impact of innovation across sectors. Support Innovation in Deep Tech by facilitating deep tech innovation and regional companies, particularly SMEs and startups, with access to expertise, data, customers and talent, fostering breakthroughs in green and digital solutions. Foster Gender-Equal and Inclusive Ecosystems by ensuring diverse participation from all societal groups and create innovation opportunities to all. Mobilize policies and synergies by integrating EU, national and regional funding instruments to boost the innovation ecosystems.

The partnership has identified the following shared innovation challenges. Each Challenge addresses both a key pan-European problem as well as specific partner regions' needs. The Challenges have been identified in an iterative process combining the regions' individual needs and further developed through a wide penta-helix stakeholder involvement in co-identification, co-ideation and co-design of opportunities. The work on Challenges will be activated in the regions' ecosystems in the project through a set of methods: Funded open calls for Joint Interregional Projects and Pre-Commercial Procurement; Agile Piloting targeting startups; and joint public procurement planning.

MetaCity innovation challenges A) Regional and urban digital twins, B) On-demand public transport in rural areas, C) Virtual doctor appointments and D) Metaverse assessment tool project – compatible with EU policies.

The General Objectives

1 Establish Joint Mission and Orchestrate Ecosystems onto it.

Rationale: Set up dialogue forums, means and measures to maintain and grow the innovation directionality between the partner regions, and between regional funding authorities and other stakeholders. Innovation directionality is achieved through formulation of Joint Mission, which acts as an anchor point ('boundary object') for multilevel and multi-stakeholder commitments to Smart City Innovation and the joint MetaCity partnership goals. Sustaining and advancing the joint commitments require proper Orchestration of actors in regional and interregional levels to discuss, design and decide on Joint Mission and its constituents. Well-defined Joint Mission enables maintaining and improving alignment of regional specialization strategies, regional co-funding.

Set up structures to Govern the Joint Mission and Innovation Challenges between regions to ensure sustaining regional commitments and co-funding, and to approve new regions to join the partnership.

Establish Ecosystem Working Groups which connect key stakeholders along the quadruple-helix from partner regions to address specific operational and strategic objectives.

Provide evidence-based recommendations and roadmap suggestions for the partner regions and EU.

2 Consolidate METACITY services and key smart city innovation enablers into single service catalogue and single point of contact.

Rationale: The aim is to improve the access to, and the usability of, the ecosystem services which are supporting the development and deployment of smart city innovations in the regions. Towards this, connect and harmonize key services provided by the project partners and those which are currently distributed and in regional silos. Develop digital single point of contact, and a single service catalogue process to enable user-friendly access to these services. Use the new MetaCity services widely in all

project activities, to make them widely familiar to the target groups in regions. Focus on two key areas: startup growth services, and interregional of testbed and living lab facilities.

Set up online knowledge base "MetaCity platform" – a joint place to find info, opportunities, people, organizations, regional data, etc.

Consolidate "MetaCity startup services" – Aggregate startup and scaleup growth services in regions.

Consolidate "MetaCity Living Lab and Tesbed Services" – Bring together regional open innovation facilities under single umbrella, and activate a large number of partner regions startup to these facilities through agile piloting.

Scale up startups selected to the project with access to finance services.

Conduct Agile Piloting – Program that integrates startups, living labs and innovation challenges to create new synergetic value.

3 Facilitate learning-by-doing Ecosystem Orchestration at each partner region.

Rationale: Advance partner regions' ecosystem capabilities in developing and deploying smart city innovations, through principles of "Learning-by-Development", "Penta-Helix" and use of MetaCity service set up.

Create online training course on key thematics, targeted to key stakeholders in regions' ecosystems, and establish a knowledge baseline through arranging and promoting open training.

Advance penta-helix engagement to the project and to ecosystem work.

Improve capabilities of the regions.

Advance capabilities for joint MetaCity space.

Advance capabilities for joint demand-driven innovation methods and aggregate demand to joint PPIs.

Advance joint approach to Gender Equality in ecosystem orchestration.

4 Orchestrate new and renewed interregional value chains to international collaboration, including MetaCity open calls for funding.

Rationale: Fund, through challenges based open calls, a programme of ambitious projects consisting of interregional consortia to develop and deploy state-of-the-art MetaCity innovations. Prior to opening of the funding competition, foster creation of European and interregional value chains, in order to improve the quality of the proposals to be received, and in order to ensure improved use of new interregional opportunities, the deployment of the MetaCity Services to the interregional innovation ecosystem actors.

Map and connect potential open call applicants and validate and refine Innovation Challenges.

Prepare regionally balanced and optimized Open Calls (FSTP) procedures.

Conduct the interregional open call for projects for MetaCity innovation Portfolio.

Support Co-Design and Demonstration of the projects selected into MetaCity Innovation Portfolio.

Guide the companies selected in Joint Innovation Portfolio and Pre-Commercial Procurement towards growth and scalability.

7.2.2 PROJECT 2 METACITY STARTUP ACCELERATOR

MetaCities Startup Accelerator (MCSA) project sets up an interregional investment pipeline for the MetaCity domain along the Baltic Sea Region (BSR) policy area. MetaCity is a novel smart city and urban innovation concept already adopted by the partner regions in policies and in ecosystem development action. MetaCity focuses on open innovation which is supported and encouraged by digital environments and social networks. MetaCity is responding to and leveraging on the post-pandemic transition to virtual co-operation and virtual urban services.

MCSA consolidates the MetaCity regions from the BSR area and creates structures and investment-focused action to level up the innovation baseline targeting SMEs and Startups. There is a parallel, on-going Horizon Europe -funded one-year planning project aiming to deliver a joint action plan for connecting the same MetaCity ecosystems, which has a wider ecosystem collaboration focus.

MCSA strengthens that by setting up the interregional investment pipeline. The Horizon Europe planning will support further specialization of the regions along the value chain. MCSA addresses the innovation divide through opening the value chains and increasing specialisation opportunities for the regions along the MetaCity value chain.

Rationalize and fit for EU-policies: The MetaCity Startup Accelerator (MCSA) project aligns well with several key EU policies and initiatives.

European Digitalization Policy: The MCSA project supports the European digitalization policy by promoting digital environments and social networks to foster open innovation. This aligns with the EU's goal of ensuring the wide use of digital technologies across the economy and society, as highlighted in the Digital Europe Programme. By leveraging virtual cooperation and urban services, the project contributes to the EU's digital transformation objectives, enhancing digital infrastructure and services in the Baltic Sea Region.

NEIA: New European Innovative Actions: The MCSA project aligns with the NEIA by setting up an interregional investment pipeline, which strengthens the performance and capacity of innovation ecosystems. This is in line with NEIA's aim to prepare joint multi-annual programmes of activities and action plans to tackle challenges at EU, national, regional, and local levels. The project's focus on SMEs and startups supports NEIA's objective of enabling innovation through experimentation and public procurement, as well as improving access to finance for innovative actions.

Local Digital Twins & CitiVERSE: The MCSA project contributes to the development of Local Digital Twins and the CitiVERSE by promoting the MetaCity concept, which includes the use of immersive technologies and 3D modeling of service environments. By fostering virtual urban services and digital cooperation, the project aligns with the goals of the CitiVERSE initiative to create interconnected and interoperable digital twins for cities.

European Data Spaces and Regional Innovation Policies: The MCSA project supports the European Data Spaces initiative by promoting data sharing and interoperability across the MetaCity regions. This aligns with the EU's vision of creating common European data spaces to foster innovation and support local businesses and ecosystems. The project's focus on regional specialization and value chain integration aligns with regional innovation policies, promoting economic and social cohesion by addressing regional disparities and enhancing innovation capacity.

Overall, the MCSA project is well-aligned with key EU policies and initiatives, supporting digital transformation, innovation, and regional development across the Baltic Sea Region.

7.2.3 PROJECT 3 GAME HUB SPORTS AND E- SPORTS DIGITAL HUB (DEVELOPING AN IMMERSIVE WORLD AND HYBRID CUSTOMER EXPERIENCES BASED ON THE 5G NETWORK

The idea of the project is to create places in the *phygital venue trend* (places, hubs) that combine the physical and digital worlds, providing recipients with hybrid experiences. Such places will be spaces where people can simultaneously experience the physical and digital worlds, which leads to a more engaging, multi-sensory experience. As part of the project, the places created will be multidimensional - they can act as a gamehub, providing entertainment and bringing together game fans, but they can also be a place of coworking, especially for people and teams associated with the gaming industry, e-sports and entertainment technologies. By offering space for work, integration with a passion for modern technologies and access to specialist equipment, such places can become a center of innovation, cooperation and creativity.

As part of the project, we will integrate the delivery of various elements such as infrastructure (5G network, equipment), services (streaming) and social experiences (events, streaming, workshops, tournaments, etc.).

The project goals focus on the following issues:

- social activation, especially among the young generation, which is increasingly characterized by a decline in social skills, leaving home and leaving the digital world - within the places/hubs, activities will be carried out aimed at showing the connection of two worlds in order to show the young generation how to spend time in a creative, interactive and integrated way,

- promoting the countries of the Baltic Sea region as an innovator, both in technological and social issues and increasing their competitiveness - the places created as part of the project, apart from being a center of modern technologies, follow the spirit of social development. The centers are a response not only to the need for modern entertainment, but also meet the needs of *digital nomads* who are looking for places that provide modern solutions,

- supporting innovation and education - the places will promote education in the fields of modern technologies, such as video games, programming, design. In addition, the space will also be a place for the development of new technologies and startups, it can act as an incubator for the development of ideas,

- support for society's access to new technologies - especially in the context of games, digital technologies, VR/AR, e-sports and other areas related to the development of innovation. Thanks to their structure and offer, digital hubs can act as a bridge between advanced technology and a wide range of recipients, both professionals and amateurs,

- Such places can significantly contribute to the development of society by integrating it into new digital realms, including the metaverse.

The areas of activity and tools used in the project:

- implementation of infrastructure - 5g network, digital equipment - multimedia screens, VR/AR equipment, streaming tool, integration of real-time monitoring and management of space,

- social activation - organization of events combining the digital and physical spheres, promotion of social activities, support for excluded groups, for example from the NEET category (people "Not in Education, Employment, or Training"),

- educational activation and development of competences - educational offer regarding the development of new technologies, workshops, training, space for exchanging experiences, cooperation with scientific units,

- partnerships and promotion - communication regarding the promotion of the BSR region as a space of digital and social innovations, establishing cooperation with 5G network operators, activation of local entrepreneurs and large, international players such as e-sports/sports federations.

Project implementation levels:

- research on social needs – local and regional, mapping of needs in the area of development of digital hubs in the Baltic countries,

- identification of possible solutions tailored to social needs – infrastructure, urban, educational needs – preparation of an action plan for the implementation of solutions and a plan of events, trainings, workshops, communication action plan,

- construction of infrastructure,

- tests, pilot openings,

- scaling, communication and promotional activities.

Why does the development of digital hubs meet technological, social and urban needs?

- the gaming industry and e-sports are among the fastest growing industries in the world - its value worldwide was estimated at $186.3 billion in 2023, and the number of gamers worldwide exceeded 3.3 billion, - in recent years, coworking spaces have become increasingly popular

- in 2020, there were over 26,000 coworking spaces in the world, and their number is growing on average by 20-30% per year. 16% of working people are people looking for remote places to work. In this group, people from the IT, gaming, technology or e-sports industries are particularly distinguished, who are looking for places that combine work space with access to modern technologies,

- the Baltic countries are a great environment for the development of digital hubs with their characteristic innovation ecosystems,

- such places are a combination of the virtual and physical world, the possibility of disseminating and increasing the accessibility of the world of metaverse and immersive experiences, which lead to increased social awareness and the development of the metacity concept.

Programmes whose objectives are potentially fostered by the project:

- Digital Europe Programme - EU funding programme focused on bringing digital technology to businesses, citizens and public administrations,

- Connecting Europe Facility - CEF Digital - the digital part of the Connecting Europe Facility (CEF Digital) will support and catalyse both public and private investments in digital connectivity infrastructures between 2021 and 2027,

- Horizon Europe - funding for research and innovation in various fields, including digital technologies, - European 5G Observatory,

- EDIH.

During the implementation of the related project, the partner countries - Finland, Estonia, Latvia, Poland and Sweden can use their strengths and potential to create synergy that will bring benefits to all parties involved. Synergy between these countries can be based on their common features, as well as on cooperation in technological, innovative, educational and economic areas.

This can be achieved through:

- joint work on developing social needs and adapting infrastructure

- local and regional activities that can be supported by developed solutions such as a hub with a similar purpose in Gdańsk, Poland - Kinguin Lounge,

- technology development - for example, support for Latvia in the scope of cooperation in the development of the 5G network,

- exchange of experiences and best practices - the project can be supported by local entities from partner countries with a high level of knowledge such as Nordic Game Incubator in Sweden and Gamefounders or Superstar Gaming Hub in Estonia

- joint educational and training programs,

- increasing regional cooperation in the e-sports and sports sector - with support and experience from Finland as an industry leader and technological innovator,

- ultimately joint promotion of the region on international markets.

Programs and policies whose goals are potentially implemented by the project:

European Digitalization Policy: The project supports the European digitalization policy by integrating digital infrastructure such as 5G networks, multimedia screens, VR/AR equipment, and streaming tools. This aligns with the EU's goal of ensuring the wide use of digital technologies across the economy and society. By providing hybrid experiences that combine physical and digital interactions, the project enhances digital infrastructure and services, contributing to the EU's digital transformation objectives.

Digital Europe Program - EU funding program focused on bringing digital technology to businesses, citizens and public administrations.

NEIA: New European Innovative Actions: The project aligns with NEIA by creating innovative spaces that foster open innovation and collaboration. This supports NEIA's aim to strengthen the performance and capacity of innovation ecosystems and their alignment towards EU-level priorities. By targeting the gaming industry, e-sports, and entertainment technologies, the project enables innovation through experimentation and public procurement, improving access to finance for innovative actions.

Connecting Europe Facility - CEF Digital - the digital part of the Connecting Europe Facility (CEF Digital) will support and catalyze both public and private investments in digital connectivity infrastructures between 2021 and 2027.

Horizon Europe - financing scientific research and innovation in various fields, including digital technologies.

European 5G Observatory.

7.2.4 PROJECT 4 REGIONAL METAVERSE ASSESSMENT TOOL PROJECT – COMPATIBLE WITH EU POLICIES (CITIVERSE ETC.)

The Metaverse Assessment Tool Project – Compatible with EU Policies aims to develop a comprehensive tool that enables European cities to evaluate their progress and readiness in metaverse development. This project addresses the need for highly accurate and up-to-date digital representations of physical environments, which are essential for enhancing design and planning, infrastructure management, and environmental monitoring.

The primary target groups for this project are cities and municipalities. These entities require advanced digital twin technologies that integrate real-time data with high-resolution spatial models to enable more efficient decision-making at regional and city levels. The tool will take into account various domains, including traffic management, emergency response, and sustainability initiatives.

Key objectives of the project include:

Developing a Metaverse Assessment Tool: Creating a tool that assesses metaverse capabilities of the municipality, city or region.

Ensuring Compatibility with EU Policies: Aligning the tool with European Union policies such as the Digital Decade, which aims to empower businesses and people in Europe to thrive in a digital future

8 IMPLEMENTATION AND ROLES: SPECIFIC REGIONAL RESPONSIBILITIES FOR PARTNER REGIONS; - COMPLEMENTING ROLES OF PARTNER REGIONS

The partnering regions of the project had their own unique focus areas in which they had concentrated thus far and without a doubt will concentrate in the future. Focus areas are listed in the following table based on the results of WP3.

There is a lot of different verticals within the partnering regions. With the exact (or narrow) definition of verticals the amount of similarities between regions is quite low. In northern partners, Norrbotten and Oulu, a lot of shared themes can be found. When grouped to larger themes (image and table x below) common focus areas can be found. For example, combining citizen service and public sector related verticals, every participating region can be part of the common consortia. Industry related verticals are a common factor in northern participants Norrbotten and Oulu. Enablers are emphasized in Baltics and Poland. Building next phase consortia it would be useful to approach subjects through larger verticals such as Public Sector/Citizen services, Industry and Enablers.

Table 1. Focus areas / regions as listed in WP3:

Focus areas	Norrbotten	Oulu	Estonia	Latvia	Poland
Health	x	x			
Sustainable industry	x	x			
Autonomous vehicles	x	x			
Smart cities	x			x	x
Society		x			x

e-governance			x		x
digitalization			x		x
Data transmission infrastructure			x		
Digital twins			x	x	
Art				x	
Tourism				x	
Cultural heritage				x	
Fire safety				x	
Digital competencies					x
Defence sector		x		x	
Logistics		x			

The focus could be summarized and categorized as below:

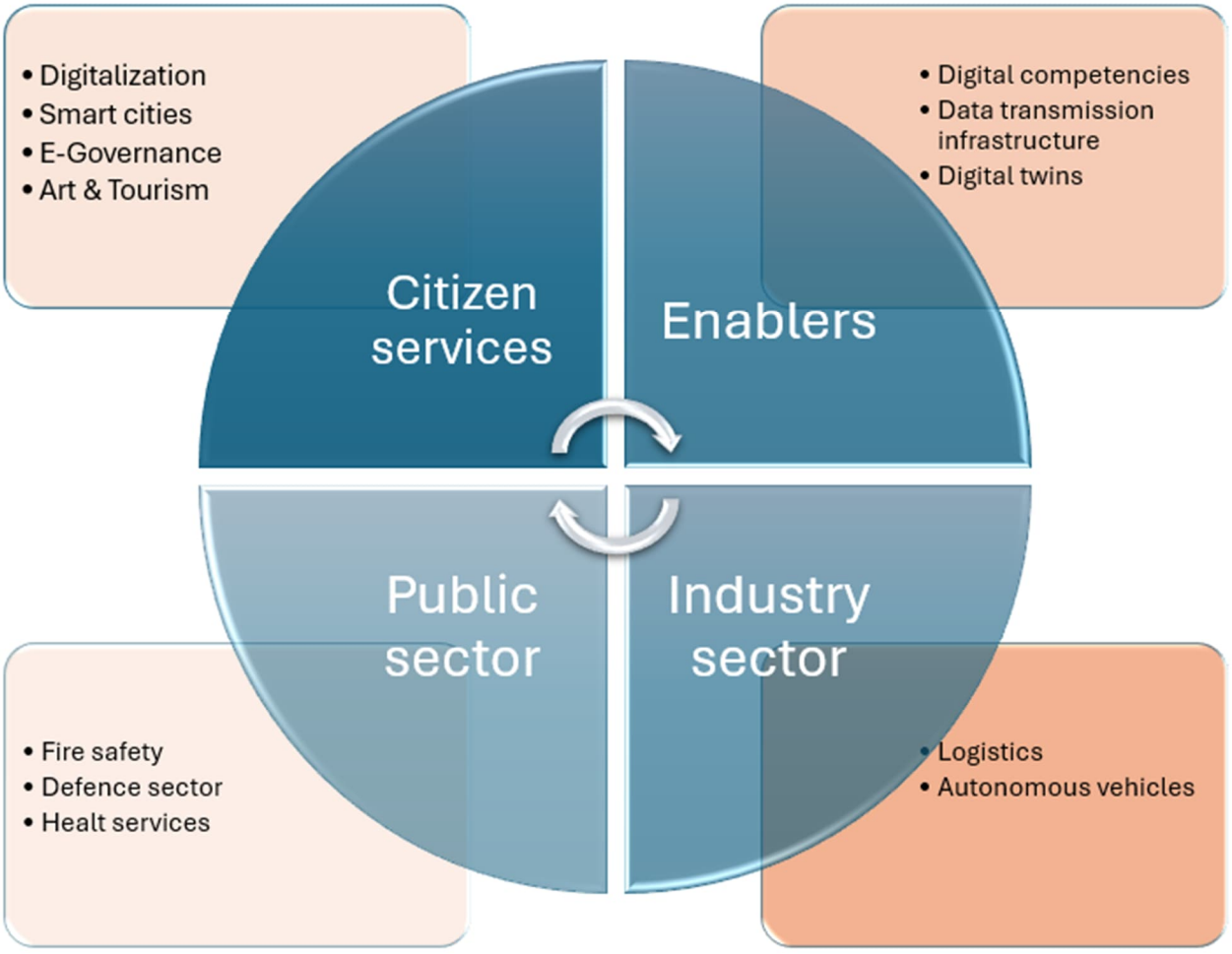


Figure 5. Metacities verticals in Smart City context.

Table 2. Focus areas grouped.

Focus areas	Norrbotten	Oulu	Estonia	Latvia	Poland

Public sector (health, fire safety, society and defence)	x	x		x	
Industry (Sustainable industry, logistics and autonomous vehicles)	x	x			
Citizen services (Digitalization, Smart cities, E-governance, Art&Tourism and Cultural Heritage)	x		x	x	x
Enablers (Data transmission infrastructure, digital twins and digital competences)			x		x

In WP3 results of the Living Lab and other work were gathered as Opportunities Catalogue. In Metacities Opportunities Catalogue, 26 different development opportunities were listed for regions to do:

1 Influencers, who champion MetaCity concept

2 Agreement on consistent conceptual MetaCity model among stakeholders

3 Clear goals and timelines, co-creation approach

4 Visualise – start small and work fast in creating understandable results

5 Communication through diverse channels (open tech labs, facilitated workshops, knowledge exchange platforms, etc.)

6 Engagement of large, credible actors

7 Oulu Innovation Alliance - strategic co-operation agreement

8 Spearhead program: Digitalisation in the changing urban environment > MetaCity and future information networks

9 MetaCity pilot area in the northern part of Oulu for testing smart city solutions

10 High interest from private companies

11 The Rails Ahead - Metaverse event – 3rd October 2024 (yearly showcase of Metaverse Oulu activities)

12 Implementation of specific use cases for specific target groups

13 Integration of small data producers into MetaCity

14 Robust data production, storage and exchange protocols

15 Calculate positive environmental impact of MetaCity technologies

16 Partnerships for new projects and initiatives

17 Education on Metaverse ecosystem operating rules

18 Adaptation of legal framework

19 Engagement in data collection and analysis

20 Support XR trials in pilot areas

21 Development of future visions and development perspectives

22 Awareness raising, networking, knowledge exchange activities

23 Cooperation with different units to get the resources

24 Engagement of business people to validate smart city tech solutions

25 Building partnerships and engaging into projects

26 Workshops to tackle legal aspects

After choosing the opportunities, cross regional deep impact analysis was conducted.

From the list across all opportunities common themes were sought.

1. Stakeholder Engagement and Partnerships:
    - Norrbotten: Influencers, engagement of large, credible actors.
    - Oulu: High interest from private companies, Oulu Innovation Alliance.
    - Estonia: Integration of small data producers, specific use cases for target groups.
    - Latvia: Partnerships for new projects, engagement in data collection.
    - Poland: Engagement of business people, building partnerships.
2. Clear Goals and Frameworks:
    - Norrbotten: Clear goals and timelines, co-creation approach.
    - Oulu: MetaCity pilot area, digitalisation in urban environment.
    - Estonia: Robust data protocols, positive environmental impact.
    - Latvia: Adaptation of legal framework, development perspectives.
    - Poland: Workshops on legal aspects, cooperation for resources.
3. Communication and Knowledge Exchange:
    - Norrbotten: Communication through diverse channels.
    - Oulu: The Rails Ahead - Metaverse event.
    - Estonia: Data production and exchange protocols.
    - Latvia: Education on Metaverse ecosystem, knowledge exchange.
    - Poland: Awareness raising, networking activities.
4. Innovation and Implementation:
    - Norrbotten: Visualise – start small and work fast.
    - Oulu: Testing smart city solutions.
    - Estonia: Implementation of specific use cases.
    - Latvia: Support XR trials in pilot areas.
    - Poland: Validate smart city tech solutions.

The common issues and opportunities across the participating regions include the need for strong stakeholder engagement, clear goals and frameworks, effective communication and knowledge exchange, and a focus on innovation and practical implementation. These elements are crucial for the successful development and deployment of the MetaCity concept in various regions.

Any future strategic actions should therefore focus on any or several of these common issues?

The distinct issues that are unique to each region's opportunities:

Norrbotten

- Influencers championing the MetaCity concept: This specific focus on influencers is unique to Norrbotten.

- Agreement on a consistent conceptual MetaCity model among stakeholders: Emphasizing consensus on the model is a distinct challenge.

Oulu

- Oulu Innovation Alliance: This specific alliance is unique to Oulu.
- MetaCity pilot area in the northern part of Oulu: The focus on a specific pilot area for testing smart city solutions is unique.
- The Rails Ahead - Metaverse event: A yearly showcase event specific to Oulu.

Estonia

- Implementation of specific use cases for specific target groups: This targeted approach is unique to Estonia.
- Robust data production, storage, and exchange protocols: Emphasis on data protocols is distinct.
- Calculate positive environmental impact of MetaCity technologies: Focus on environmental impact is unique.

Latvia

- Education on Metaverse ecosystem operating rules: This educational focus is unique to Latvia.
- Adaptation of legal framework: Legal framework adaptation is a distinct issue.
- Support XR trials in pilot areas: Specific support for XR trials is unique.

Poland

- Awareness raising, networking, knowledge exchange activities: This broad focus on awareness and networking is unique to Poland.
- Workshops to tackle legal aspects: Specific workshops on legal issues are distinct.
- Cooperation with different units to get resources: Emphasis on resource cooperation is unique.

Each region has its own unique challenges and opportunities that are not shared with the others. These distinct issues highlight the specific needs and strategic focuses of each region in developing and implementing the MetaCity concept.

As an example, results obtained in the Metacities project work outlines specific regional responsibilities for partner regions to ensure complementing roles. Here is one conclusion about the key responsibilities for each partner region in the interregional cooperation:

Oulu Region, Finland:

- Focus on innovation and research especially connectivity (6G) and metaverse through the Oulu Innovation Alliance cooperation treaty.
- International and national collaboration hub via the "Innocities" network and the "National Metaverse Network" ERDF-project. Also active involvement with Business Finland and Dimec in MEFI-programs (Metaverse Finland) network and international initiatives.
- Oulu TestBeds and Living Labs: Oulu offers a variety of testbeds and living labs that provide opportunities for companies and researchers to test and develop their products and services in real-world environments.

Tallinn, Estonia:

- National lead role by the FinEst Centre for Smart Cities in advancing the MetaCity concept.
- Focus on research, consortium building, EU funding applications, and innovation ecosystem development.

- Serve as a national and international contact point for MetaCity activities and spearhead efforts in prototyping and piloting novel technologies.

Riga, Latvia:

- Leverage strategic location and growing technological capabilities to contribute to regional, national and international collaboration.
- Integration of MetaCity activities with regional development strategies like RIS3 and ERDF.
- Latvia focuses on building broader networks through events like the 5G Techritory forum, establishing partnerships within the Baltic Sea Region, and involving underrepresented groups. This approach seeks to attract new expertise, share best practices, and secure funding, creating a comprehensive and inclusive MetaCity ecosystem.

Warmia and Mazury Region, Poland:

- Focus on digitization of public services, intelligent management systems, IT infrastructure, and digital education.
- Support digital transformation of the public sector through the EdTechHub Accelerator.
- Promote the MetaCity concept through national and international initiatives.

Region Norrbotten, Sweden:

- Collaboration through networks of the public sector, academia, and industry. Key players include Luleå University of Technology, regional authorities, and major industries like mining and energy.
- Focus on digitalization of public services and development of smart city solutions.
- Test Beds and Living Labs: Norrbotten has established several test beds and living labs, such as the 5G test bed, which provide platforms for businesses and researchers to test next-generation mobile technologies in real world scenarios.

9 CONCLUSIONS AND COLLABORATION ITEMS AGREED UPON

Metaverse refers to a collective virtual shared space that connects and transcends physical, digital and augmented reality. Metaversum related business is estimated to grow explosively during next ten years. Metaverse is seen as an important concept in Europe. The European Council has urged the European Union to stay at the forefront of metaverse related development and to ensure and strengthen European countries pioneering and competitiveness in relation to other countries where metaverse development already is well advanced. There are several European policies completely or partly related to metaverse development in action during program period 2021 – 2027. Those include for example European digitalization policy, NEIA: New European Innovative Actions, Local Digital Twins & CitiVERSE, European Data Spaces and Regional Innovation policies; Smart Specialization Program. One excellent National example is Finnish National Metaverse Strategy (by BusinessFinland). Since the metaverse is seen as an important element of European digitalization, there are several funding mechanisms to be used for its development in regional, national and international (European) level.

For visions and objectives of Collaborative Regional Metaverses it can be said that the MetaCity collaboration is organized through regional alliances, national networks, and international

partnerships, integrating with partners' activities and expanding through established networks and new projects. The collaboration aims to promote the metaverse theme and secure funding for future initiatives. Still metaverse and related concepts are relative new thing to regions in Europe. In order to integrate activities of different European regions following steps should be taken:

0 All the partnering regions need a torchbearer organization(s) for Metacity theme.

1 All the partnering regions need to have a common definition of developing theme, in this case MetaCity (metaverse).

2 All the partnering regions need to do technical readiness or technical maturity assessment of regions/ecosystems. This is done in order to see if it´s possible to regions to do cooperation.

3 All the regions need mapping of key stakeholders in their own region.

4 All the regions need to do mapping of their activities considering metaverse: is there a local strategy or program considering MetaCity (or metaverse or related subject)?

5 All the regions need assuring of resources by gathering consortiums to EU-calls and resources for writing applications.

6 Disseminating information in EU-level networks like Eurocities Digital Forum, Open and Agile Smart Cities network and Living-in.eu network is important.

The long-term vision for MetaCity regions includes strong support for startups and scaleups, integration of international best practices, establishment of test beds and living labs, comprehensive skills and training programs for stakeholders, and platforms for both pre-commercial and commercial demonstrations. This vision is informed by ongoing dialogue with stakeholders and practical insights from living lab experiences, aiming to create a collaborative and innovative MetaCity ecosystem.

From the opportunities catalogue´s 26 ideas 8 were voted to be chosen for the most important in deep impact analyses:

1 Engagement of large, credible actors (cross regional opportunities impact analysis 55 points)

Engagement of large credible actors was seen as the most important activity in deep impact analysis. Engaging large, credible actors in the development of the metaverse is crucial for making it possible to progress in regional development, ensuring robust technological advancements and widespread adoption. The region should identify key stakeholders in this theme.

Firstly, identifying and targeting the right actors is essential. These actors typically include major technology companies, industry leaders, and influential organizations across various sectors such as entertainment, education, and healthcare. Their involvement can bring significant resources, expertise, and credibility to metaverse projects.

Engaging large, credible actors in metaverse development requires following opportunities with high point in deep impact analysis, for example developing a compelling value proposition, establishing strategic partnerships, conducting engagement activities, and maintaining effective communication and outreach. By following these steps, organizations can attract and retain key players, driving the successful development and adoption of the metaverse.

Question for regions: Who are the most important metaverse related actors in your region?

2 Clear goals and timelines, co-creation approach (55 points)

The second most important opportunity listed was clear goals and timelines. Monitoring and evaluation are necessary to measure the success of engagement activities. Setting clear goals, timelines and metrics and regularly reviewing and adjusting the strategy based on feedback and outcomes, can ensure continuous improvement and sustained engagement.

Question for regions: How can you measure metaverse development?

3 Building partnerships and engaging into projects (54 points) and 6 Partnerships for new projects and initiatives (51 points)

Building partnerships for projects and initiatives was in the third place (also opportunity 6 was with this theme). Strategic partnerships play a vital role in metaverse development. Collaborating with key industry and research & innovation players to co-create and co-develop metaverse solutions can foster innovation and ensure the successful implementation of projects. Leveraging existing networks and platforms can facilitate introductions and collaborations, making it easier to establish these partnerships.

Question for regions: How wide is your partner network?

4 Implementation of specific use cases for specific target groups (53 points)

Implementing specific use cases for target groups in the metaverse involves several key strategies to ensure success and relevance.

1 Identify Target Groups and Their Needs: Start by clearly identifying the specific target groups you want to engage with in the metaverse. Understand their unique needs, preferences, and challenges. This could involve conducting surveys, focus groups, and market research to gather insights.

2 Develop Tailored Use Cases: Based on the insights gathered, develop use cases that are specifically tailored to the needs and interests of the target groups. This could include educational programs for students, virtual training sessions for professionals, or immersive entertainment experiences for consumers.

3 Leverage Existing Platforms and Technologies: Utilize existing metaverse platforms and technologies to implement the use cases. This can help in reducing development time and costs while ensuring that the solutions are built on proven and reliable technologies.

4 Collaborate with Stakeholders: Engage with key stakeholders, including technology providers, industry experts, and community leaders, to co-create and validate the use cases. Collaboration can bring in diverse perspectives and expertise, enhancing the relevance and effectiveness of the solutions.

5 Pilot and Iterate: Start with pilot projects to test the use cases in a controlled environment. Gather feedback from the target groups and stakeholders and use this feedback to iterate and improve the solutions. Piloting allows identifying and addressing any issues before a full-scale implementation.

6 Ensure Accessibility and Inclusivity: Make sure that the metaverse solutions are accessible and inclusive for all members of the target groups. This includes considering factors such as device compatibility, user interface design, and support for different languages and abilities.

7 Measure and Evaluate Impact: Establish clear metrics and evaluation frameworks to measure the impact of the use cases. Regularly assess the performance and outcomes and use the insights to make data-driven decisions for further improvements.

Question for regions: Have you found a very useful use case?

5 Communication through diverse channels (open tech labs, facilitated workshops, knowledge exchange platforms, etc.) (51 points)

Effective communication and outreach are crucial for maintaining engagement. A comprehensive communication plan that utilizes various channels, including social media, industry publications, and direct outreach, can help reach target actors. Highlighting success stories and case studies can build credibility and generate interest.

Developing a compelling value proposition is another critical step. Highlighting the benefits of participating in metaverse development, such as technological innovation, market opportunities, and enhanced brand positioning, can attract these actors. Tailored presentations and materials that address the specific interests and goals of each target actor can be highly effective.

Engagement activities such as workshops, webinars, and conferences are also important. These events provide opportunities to showcase the potential of the metaverse and engage with target actors. Demonstrating practical applications and benefits through pilot projects and use cases can further build interest and commitment.

Question for regions: Have you developed a value proposition for your metaverse?

7 Adaptation of legal framework (49 points)

Adapting a legal framework for the metaverse involves several key steps to ensure it is comprehensive and effective:

1 Stakeholder Engagement: Involve a wide range of stakeholders, including technology companies, legal experts, policymakers, and users, to gather diverse perspectives and ensure the framework addresses all relevant issues.

2 Clear Definitions and Scope: Clearly define what constitutes the metaverse and its various components. This helps in setting the boundaries and understanding the legal implications of different activities within the metaverse.

3 Data Privacy and Security: Establish robust data privacy and security regulations to protect users' personal information and ensure secure transactions within the metaverse.

4 Intellectual Property Rights: Adapt existing intellectual property laws to cover digital assets and creations within the metaverse, ensuring creators' rights are protected.

5 Consumer Protection: Implement consumer protection laws to safeguard users from fraud, exploitation, and other harmful activities within the metaverse.

6 Interoperability Standards (for example MIMs): Promote the development of interoperability standards to ensure different metaverse platforms can work together seamlessly, enhancing user experience and innovation.

7 Regular Updates and Reviews: Continuously review and update the legal framework to keep pace with technological advancements and emerging challenges in the metaverse.

Question for regions: Who is the responsible stakeholder to do this work?

8 Engagement in data collection and analysis (49 points)

Engaging in data collection and analysis within the metaverse context involves several important factors to ensure effectiveness and ethical considerations.

1 Data Privacy and Security: Ensuring robust data privacy and security measures is crucial. This includes protecting users' personal information and securing data against breaches and unauthorized access.

2 Ethical Considerations: Ethical guidelines should be established to govern data collection and analysis. This includes obtaining informed consent from users, being transparent about data usage, and ensuring data is used responsibly.

3 Interoperability and Standardization: Developing interoperability standards to ensure that data collected from different metaverse platforms can be integrated and analyzed seamlessly. This helps in creating a cohesive data ecosystem.

4 Data Quality and Accuracy: Ensuring the data collected is of high quality and accuracy is essential for meaningful analysis. This involves using reliable data collection methods and regularly validating the data.

5 User Engagement and Trust: Building trust with users by being transparent about data collection practices and providing them with control over their data. Engaging users in the process can also lead to more accurate and comprehensive data.

6 Technological Infrastructure: Having the necessary technological infrastructure to support large-scale data collection and analysis. This includes advanced communication technologies like 5G/6G for efficient data transmission and integration.

7 Regulatory Compliance: Ensuring compliance with relevant data protection regulations and standards, such as the EU General Data Protection Regulation (GDPR), to avoid legal issues and build user trust.

Question for regions: Is your region compliant with the European Data Spaces initiative?

(9 Agreement on consistent conceptual MetaCity model among stakeholders (48 points))

Because opportunities 3 and 6 (building partnerships) were so similar, a nineth bonus opportunity is dealt with. The agreement on a consistent conceptual MetaCity model among stakeholders in the metaverse context is an important step towards ensuring cohesive and effective collaboration. One example among the project partners in this is Oulu Innovation Alliance treaty in with the metaverse/metacity is one of the spearhead programmes. When building a regional agreement between the stakeholders, following points should be considered.

1 Definition and Scope: The MetaCity model should be is defined in a way that every stakeholder can commit to it.

2 Stakeholder Involvement: The agreement should involve a wide range of stakeholders, including regional innovation strategies, public sector entities, private companies, research institutions, and citizens. This diverse involvement ensures that the model addresses various perspectives and needs, promoting inclusivity and comprehensive development.

3 Collaborative Regional Metaverses: The agreement should outline the vision and objectives of collaborative regional metaverses, for example in other regions, and integrate it into partners' activities, expanding beyond the current consortium.

4 Monitoring and Evaluation: The agreement should emphasize the importance of monitoring and evaluating the progress of the MetaCity model. This includes setting clear goals and metrics, regularly reviewing outcomes, and making necessary adjustments to ensure continuous improvement and alignment with stakeholders' needs.

In conclusion, the agreement on a consistent conceptual MetaCity model among stakeholders in the metaverse context is a comprehensive and collaborative effort. It defines the scope and vision of the MetaCity, involves diverse stakeholders, outlines specific projects and responsibilities, and emphasizes continuous monitoring and evaluation to ensure successful implementation and development.

Question for regions: Does your region have any cooperation contract suitable for metaverse development?

9.1 LIVING LABS WP4

The Living Lab workshops were held in the participating regions as onsite and online events during November 2024. The entities from the following groups seen in table x were invited to participate. Final number of participants was 97. About 60 % of participants were men and 40 % women. Number of participants under 25 years or above 60 years were few.

Table 3. Living Labs participants.

Region/Country	Total number of participants	Startups & Scaleups	SMEs	Large enterprises	Univestities	Governmetal and municipal agencies	Decision-makers	Civic society representatives
Norrbotten	11	1	2	0	5	1	0	2
Oulu	18	0	0	1	13	3	0	1
Estonia	35	1	1	0	2	4	1	4
Lativa	24	5	5		1	10		3
Warmia-Masuria	9	1	4	0	2	0	0	2
Total:	**97**	**8**	**12**	**1**	**23**	**18**	**1**	**12**

Table 4. Living Labs participants by gender and age.

Region/Country	Total number of participants	Women	Men	Aged below 25	Aged above 60
Norrbotten	11	5	6	4	1
Oulu	18	4	14	0	2

Estonia	35	18	17	N/A	N/A
Lativa	24	8	16	0	1
Warmia-Masuria	9	5	4	1	1
Total:	**97**	**40**	**57**	**5**	**5**

During the workshops, the topic of the catalogue of opportunities was taken up, which was prioritized during the project implementation as a JAP assumption. The prioritization made in JAP was accepted and some additional topics were brought forward in the discussion.

The main results of the living labs can be summarised as follows:

1 Collaboration Between Companies and Research Institutions: The collaboration between companies and research institutions is crucial for the development of the metaverse. This partnership fosters innovation, accelerates technological advancements, and ensures that research findings are effectively translated into practical applications.

2 Infrastructure Development: The development of infrastructure enabling the metaverse still remains a priority. For example in Oulu region, the focus on connectivity and 6G research is a significant strength. Additionally, building infrastructure in sparsely populated areas is essential to ensure equality and inclusivity. This approach not only supports technological advancements but also promotes social equity by providing equal access to digital services.

3 Metaverse Society Aspects: The development of the metaverse society aspects is vital. In Finland, the Metaverse Society Program aims to integrate education, culture, and sports into the metaverse. This holistic approach ensures that the metaverse is not just a technological advancement but also a societal transformation that enhances various aspects of life.

4 Interdisciplinary and Human-Centered Approach: The definition of the metaverse requires a more interdisciplinary and human-centered approach. It is not just about technology, but also about how it impacts and integrates with human lives. This perspective ensures that the metaverse is developed in a way that is inclusive, accessible, and beneficial to all.

5 Future Technologies: Examining future technologies, such as those expected by 2030, is essential. This forward-looking approach helps in anticipating technological trends and preparing for future developments. It also ensures that the metaverse remains relevant and adaptable to future advancements.

6 Business Models and Value Chains: Examining business models and value chains adds significant value to the development of the metaverse. Understanding how different stakeholders can benefit and contribute to the metaverse helps in creating sustainable and profitable ecosystems. This analysis also aids in identifying potential revenue streams and economic opportunities.

7 Cybersecurity: The cybersecurity market is a critical component of the metaverse. Technologies like blockchain can enhance security and trust within the metaverse. Ensuring robust cybersecurity measures is essential to protect users and maintain the integrity of the metaverse.

8 Sustainable Development: The realization of sustainable development perspectives is crucial in developing the metaverse. This includes considering environmental impacts, promoting sustainable practices, and ensuring that the metaverse contributes positively to global sustainability goals.

9 Awareness and Understanding: Increasing awareness and understanding of the MetaCity concept through networking and knowledge exchange is vital. Engaging stakeholders, sharing best practices,

and fostering a collaborative environment helps in building a strong foundation for the MetaCity initiative.

10 Business Engagement: Engaging businesses to validate smart city technologies is essential. Businesses play a crucial role in testing and implementing new technologies, ensuring that they are practical and effective. Building partnerships and engaging in new projects and initiatives further supports this goal.

11 XR Technology Trials: Supporting XR technology trials in pilot areas is important for testing and refining new technologies. These trials provide valuable insights and help in identifying potential challenges and opportunities. Promoting digitalization in urban environments also supports the broader goal of creating smart, connected cities.

12 Partnerships and Innovation Hubs: Collaboration with major technology firms and academia is emphasized for credibility and resource mobilization. Innovation hubs, such as the Cinevilla Innovation Hub, serve as testing grounds for VR/AR technologies and foster innovation through events like hackathons.

13 Regulatory Support: Adapting legal frameworks to support innovation and ensure EU compliance is a priority. Regulatory support helps in creating an enabling environment for the development and implementation of new technologies.

14 Skill Building and Communication: Upskilling through workshops, tech labs, and hackathons is critical for fostering stakeholder engagement. Communication and outreach efforts are essential to maintain momentum, raise awareness, and ensure that all stakeholders are informed and involved in the development process.

Conclusions from the Living Labs highlight the importance of collaboration, infrastructure development, interdisciplinary approaches, sustainable development, and regulatory support in advancing the MetaCity concept across the Baltic Sea Region.

General Project Plan from the Joint Action Plan (JAP) Results

This general project plan and timetable is based on the results of JAP and can be used as a starting point for one or more project plans related to metaverse development. Naturally amount of resources to use define the final timetable of the project.

1. Engagement of Large, Credible Actors

- Objective: Identify and engage major technology companies, industry leaders, and influential organizations such as universities.
- Activities:
    - Identify key stakeholders (Month 1)
    - Develop a compelling value proposition (Month 2)
    - Establish strategic partnerships (Month 3)
    - Conduct engagement activities (Month 4-6)
    - Maintain effective communication and outreach (Ongoing)

2. Clear Goals and Timelines, Co-Creation Approach

- Objective: Set clear goals, timelines, and metrics for monitoring and evaluation.
- Activities:
    - Define clear goals and timelines (Month 1)
    - Establish metrics for success (Month 2)
    - Regularly review and adjust strategy based on feedback (Quarterly)

3. Building Partnerships and Engaging in Projects

- Objective: Foster strategic partnerships to co-create and co-develop metaverse solutions.
- Activities:
    - Identify potential partners (Month 1)
    - Leverage existing networks and platforms (Month 2)
    - Establish partnerships (Month 3-4)
    - Engage in collaborative projects (Ongoing)

4. Implementation of Specific Use Cases for Target Groups

- Objective: Develop and implement tailored use cases for specific target groups.
- Activities:
    - Identify target groups and their needs (Month 1)
    - Collaborate with stakeholders (Month 2)
    - Leverage existing platforms and technologies (Month 3)
    - Develop tailored use cases (Month 4-5)
    - Pilot and iterate (Month 6-8)
    - Ensure accessibility and inclusivity (Ongoing)
    - Measure and evaluate impact (Ongoing)

5. Communication Through Diverse Channels

- Objective: Maintain effective communication and outreach through various channels.
- Activities:
    - Develop a comprehensive communication plan (Month 1)
    - Utilize social media, industry publications, and direct outreach (Ongoing)
    - Highlight success stories and case studies (Ongoing)
    - Conduct workshops, webinars, and conferences (Quarterly)

6. Adaptation of Legal Framework

- Objective: Develop a comprehensive legal framework for the metaverse.
- Activities:
    - Engage stakeholders (Month 1)
    - Define clear definitions and scope (Month 2)
    - Establish data privacy and security regulations (Month 3)
    - Adapt intellectual property laws (Month 4)
    - Implement consumer protection laws (Month 5)
    - Promote interoperability standards (Month 6)
    - Regularly review and update the legal framework (Ongoing)

7. Engagement in Data Collection and Analysis

- Objective: Ensure effective and ethical data collection and analysis.
- Activities:
    - Ensure data privacy and security (Month 1)
    - Establish ethical guidelines (Month 2)
    - Develop interoperability standards (Month 3)
    - Ensure data quality and accuracy (Ongoing)
    - Build user engagement and trust (Ongoing)
    - Develop technological infrastructure (Ongoing)
    - Ensure regulatory compliance (Ongoing)

8. Agreement on Consistent Conceptual MetaCity Model

- Objective: Establish a consistent MetaCity model among stakeholders.
- Activities:
    - Define the MetaCity model (Month 1)

- Involve diverse stakeholders (Month 2)
- Outline collaborative regional metaverses (Month 3)
- Monitor and evaluate progress (Ongoing)

9. Living Labs etc. tools for communication

- Objective: Foster collaboration between companies and research institutions.
- Activities:
  - Develop infrastructure (Ongoing)
  - Integrate metaverse society aspects (Ongoing)
  - Adopt an interdisciplinary and human-centered approach (Ongoing)
  - Examine future technologies (Ongoing)
  - Develop business models and value chains (Ongoing)
  - Ensure robust cybersecurity (Ongoing)
  - Promote sustainable development (Ongoing)
  - Increase awareness and understanding (Ongoing)
  - Engage businesses to validate smart city technologies (Ongoing)
  - Support XR technology trials (Ongoing)
  - Collaborate with innovation hubs (Ongoing)

Table 4. General timetable for the project:

Activity	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7-12	Ongoing
Identify Key Stakeholders	X							
Develop Value Proposition		X						
Establish Partnerships			X	X				
Conduct Engagement Activities				X	X	X		
Define Goals and Timelines	X							
Establish Metrics		X						
Review and Adjust Strategy								X
Identify Target Groups	X							
Collaborate with Stakeholders		X						
Leverage Platforms			X					
Develop Use Cases				X	X			
Pilot and Iterate						X	X	
Ensure Accessibility								X
Measure and Evaluate Impact								X
Develop Communication Plan	X							

Utilize Communication Channels								X
Highlight Success Stories								X
Conduct Workshops								X
Engage Stakeholders (Legal)	X							
Define Legal Scope		X						
Establish Data Privacy			X					
Adapt IP Laws				X				
Implement Consumer Protection					X			
Promote Interoperability						X		
Review Legal Framework								X
Ensure Data Privacy	X							
Establish Ethical Guidelines		X						
Develop Interoperability Standards			X					
Ensure Data Quality								X
Build User Trust								X
Develop Tech Infrastructure								X
Ensure Regulatory Compliance								X
Define MetaCity Model	X							
Involve Stakeholders		X						
Outline Regional Metaverses			X					
Monitor and Evaluate								X
Develop Infrastructure								X
Integrate Society Aspects								X
Adopt Interdisciplinary Approach								X
Examine Future Technologies								X
Develop Business Models								X
Ensure Cybersecurity								X
Promote Sustainable Development								X

Increase Awareness								X
Engage Businesses								X
Support XR Trials								X
Collaborate with Innovation Hubs								X

Based on the results of Metacities Joint Action Plan, four (4) interregional pilot project ideas were chosen to be prepared in the future. The first of the project ideas was to build a European network of Metacities Hubs, the second to support startups in the context, the third develop gamehubs and the fourth to create a toolset for metaverse assessment for European regions.

Project 1 Connected Regional Innovation Valley for MetaCity Innovations

Project 2 MetaCity Startup Accelerator

Project 3 Game hub sports and e- sports digital hub (developing an immersive world and hybrid customer experiences based on the 5G network)

Project 4 Regional Metaverse assessment tool project – compatible with EU policies (CitiVerse etc.)

10 APPENDICES AND REFERENCES

https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_en

https://errin.eu/RI-Policy/new-european-innovation-agenda

https://living-in.eu/news/ldt-citiverse-edic-fact

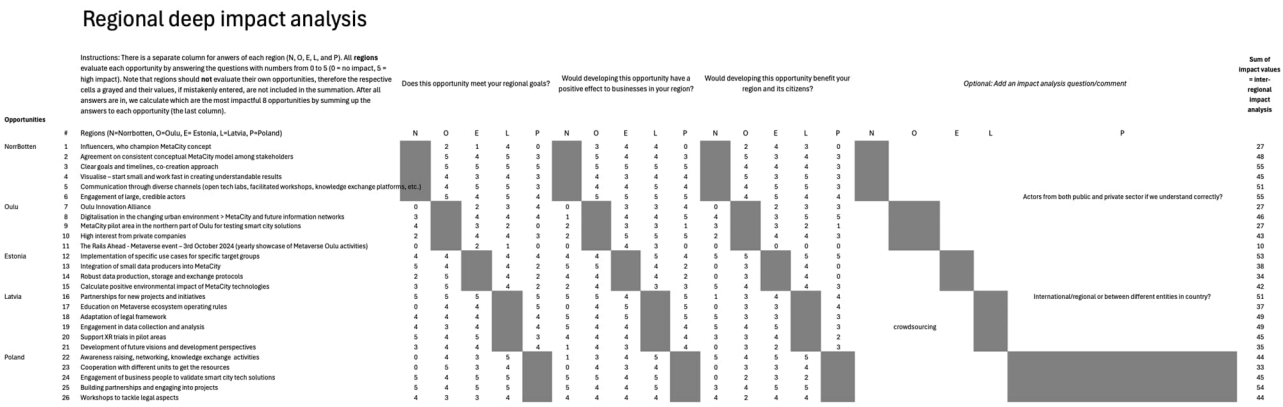
https://digital-strategy.ec.europa.eu/en/policies/data-spaces

https://www.europarl.europa.eu/RegData/etudes/BRIE/2022/733557/EPRS_BRI(2022)733557_EN.pdf

1. Deep Impact Analysis of Opportunities Catalogue
2. Living Labs summaries
3. European Metacities MOU
4. Letters of Intent

Image of the Deep Impact Analysis of Opportunities Catalogue.

The full version to be found in a separate xls file, added as deliverable to the SyGMa portal.



Regional deep impact analysis

Opportunities	#	Regions (N=Norrbotten, O=Oulu, E= Estonia, L=Latvia, P=Poland)	Does this opportunity meet your regional goals?					Would developing this opportunity have a positive effect to businesses in your region?					Would developing this opportunity benefit your region and its citizens?					*Optional: Add an impact analysis question/comment*					Sum of impact values = inter-regional impact analysis
			N	O	E	L	P	N	O	E	L	P	N	O	E	L	P	N	O	E	L	P	
NorrBotten	1	Influencers, who champion MetaCity concept		2	1	4	0		3	4	4	0		2	4	3	0						27
	2	Agreement on consistent conceptual MetaCity model among stakeholders		5	4	5	3		5	4	4	3		5	3	4	3						48
	3	Clear goals and timelines, co-creation approach		5	5	5	5		5	5	5	5		4	4	4	3						55
	4	Visualise – start small and work fast in creating understandable results		4	3	4	3		4	3	4	4		5	3	5	3						45
	5	Communication through diverse channels (open tech labs, facilitated workshops, knowledge exchange platforms, etc.)		4	5	5	3		4	4	5	4		4	5	5	3						51
	6	Engagement of large, credible actors		5	4	5	4		5	5	5	5		4	5	4	4					Actors from both public and private sector if we understand correctly?	55
Oulu	7	Oulu Innovation Alliance	0		2	3	4	0		3	3	4	0		2	3	3						27
	8	Digitalisation in the changing urban environment > MetaCity and future information networks	3		4	4	4	1		4	4	5	4		3	5	5						46
	9	MetaCity pilot area in the northern part of Oulu for testing smart city solutions	4		3	2	0	2		3	3	1	3		3	2	1						27
	10	High interest from private companies	2		4	4	3	2		5	5	5	2		4	4	3						43
	11	The Rails Ahead – Metaverse event – 3rd October 2024 (yearly showcase of Metaverse Oulu activities)	0		2	1	0	0		4	3	0	0		0	0	0						10
Estonia	12	Implementation of specific use cases for specific target groups	4	4		4	4	4	4		5	4	5	5		5	5						53
	13	Integration of small data producers into MetaCity	5	4		4	2	5	5		4	2	0	3		4	0						38
	14	Robust data production, storage and exchange protocols	2	5		4	2	4	4		4	2	0	3		4	0						34
	15	Calculate positive environmental impact of MetaCity technologies	3	5		4	2	2	4		3	3	5	4		4	3						42
Latvia	16	Partnerships for new projects and initiatives	5	5	5		5	5	5	4		5	1	3	4		4					International/regional or between different entities in country?	51
	17	Education on Metaverse ecosystem operating rules	0	4	4		5	0	4	5		5	0	3	3		4						37
	18	Adaptation of legal framework	4	4	4		4	5	4	5		5	5	3	3		3						49
	19	Engagement in data collection and analysis	4	3	4		4	5	4	4		4	5	4	5		3		crowdsourcing				49
	20	Support XR trials in pilot areas	5	4	5		3	4	4	4		4	3	3	4		2						45
	21	Development of future visions and development perspectives	3	4	4		4	1	4	3		4	0	3	2		3						35
Poland	22	Awareness raising, networking, knowledge exchange activities	0	4	3	5		1	3	4	5		5	4	5	5							44
	23	Cooperation with different units to get the resources	0	5	3	4		0	4	3	4		0	3	3	4							33
	24	Engagement of business people to validate smart city tech solutions	5	4	5	5		5	5	4	5		0	2	3	2							45
	25	Building partnerships and engaging into projects	5	4	5	5		5	4	4	5		3	4	5	5							54
	26	Workshops to tackle legal aspects	4	3	3	4		4	4	4	4		4	2	4	4							44

LIVING LAB – OULU, 22.11. and 26.11.2024

The Living Lab workshops were held in Oulu Region in the form of two online events (Teams) that took place in 22nd and 26th of November 2024. The entities from the following areas were invited to participate:

- Startups and scaleups,
- SMEs,
- Large enterprises,
- Universities,
- Governmental and municipal agencies,
- Civic society representatives.

The Living Labs were attended by 18 people representing Large Enterprizes (1), scientific units (13), governmental and municipal units (3) and NGOs - civic society representatives (1).

During the meetings, topics related to the summary of activities and results of the Metacities project were discussed, as well as the assumptions of the Joint Action Plan and future activities that should be implemented in order to develop the Metacity concept.

During the workshops, the topic of the catalog of opportunities was taken up, which was prioritized during the project implementation as a JAP assumption. From the perspective of Oulu Region stakeholders the results of the Joint Action Plan were seen beneficial. The prioritization made in JAP was accepted and some additional topics were brought forward in the discussion.

- The collaboration between companies and research institutions was seen as an important theme for the development of the metaverse.
- The development of infrastructure enabling the metaverse remains important in Oulu and other regions willing to progress in this metaverse context. One strenght for Oulu Region is connectivity and 6G research. The infrastructure theme can also include the infrastructure built in sparsely populated areas, which enables equality.
- The development of the metaverse society aspects is important. In Finland we have Metaverse Society Program starting for this purpose. Can include for example education, culture and sports.
- The definition of the metaverse still needs more interdisciplinarity approach and human-centeredness, not just technology.
- What will the technologies be in the future, for example 2030? This should be examined.
- Examining business models and value chains would add value to the work.
- How does the cybersecurity market is seen as a part of the metaverse – for example block chain technologies?
- The realization of sustainable development perspectives as the part of developing the metaverse is important.

The workshops were a good opportunity to present the initial assumptions of the JAP and the discussion. It was an opportunity to compare the needs of the stakeholders with the project assumptions. Moreover, the workshop effectively strengthened the role of Oulu Region as a partner in the Baltic Sea Region strategy, matching regional needs to the wider Metacities concept.

LIVING LAB – NORRBOTTEN 25.10.2024

The Metaverse Lab workshop was held at Luleå University of Technology (LTU), where entities from the following areas were invited to participate:

- Startups,
- SMEs,
- Academia,
- Municipal agencies,
- Civic society representatives,
- Students.

The workshop was attended by 11 participants, including 5 women and 5 men. Four participants were under 25 years old, and one was over 60 years old.

During the workshop, participants explored various types of XR technologies with the goal of examining their potential in building Metacity Norrbotten. The discussions focused on the possibilities of using Metaverse technologies as tools for urban development within the Metacity concept. Several promising ideas emerged, which included:

- Increasing awareness and understanding of the Metacity concept through networking and knowledge exchange,
- Engaging businesses to validate smart city technologies,
- Building partnerships for new projects and initiatives,
- Supporting XR technology trials in pilot areas,
- Promoting digitalization in urban environments.

Attention was also given to the importance of involving credible actors to support the development of Metacity Norrbotten on a regional level.

The workshop proved to be a valuable opportunity for aligning the needs of various stakeholders with the project's assumptions. It highlighted the value of the Metaverse as a strategic tool for developing a sustainable urban environment and demonstrated the significant role of Norrbotten in the broader Metacity initiative.

LIVING LAB – LATVIA 08.11.2024

The Living Lab workshop in Latvia focused on advancing the Metacity initiative by fostering collaboration among 24 stakeholders from diverse sectors. Key discussions revolved around strategic partnerships, planning future steps, and leveraging Cinevilla as a hub for VR/AR innovation. Highlights included:

1. **Key Themes reviewed and outcomes:**
    - **Review of 5G Techritory Forum 2024** results, including the **European Partnership Memorandum of Understanding (MoU)** to drive Metacity development.
    - **Partnerships:** Collaboration with major technology firms and academia was emphasized for credibility and resource mobilization.
    - **Cinevilla Innovation Hub:** Cinevilla's potential as a VR/AR testing ground was discussed, with a hackathon planned for June 2025 in partnership with Vidzeme University.
    - **Regulatory Support:** Adaptations in legal frameworks were prioritized, focusing on EU compliance and innovation enablement.
    - **Skill Building:** Upskilling through workshops, tech labs, and hackathons was identified as critical to fostering stakeholder engagement.

- **Communication:** Outreach efforts were highlighted as essential to maintaining momentum and raising awareness.

2. **Future Plans:**
    - Plans for forming an international association to support Metacity strategies.
    - Hackathon in June 2025 in collaboration with Vidzeme University of Applied Sciences and Cinevilla Studio to be organized.
    - Next stakeholder meeting scheduled for January 2025 to consolidate ideas.

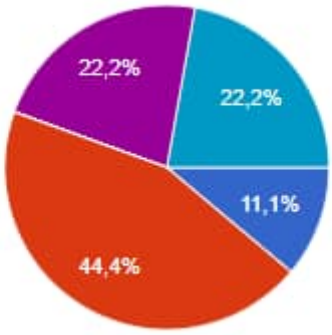
The workshop successfully reinforced Latvia's role in the Baltic Sea Region strategy, aligning local initiatives with international Metacity goals while focusing on innovation, inclusivity, and sustainability.

LIVING LAB – POLAND, 20-22.11.2024

The Living Lab workshops were held in Poland in the form of consultations that took place from 20 to 22 of November, 2024. The entities from the following areas were invited to participate:

- Startups&scaleups,
- SMEs,
- Large enterprises,
- Universities,
- Governmental ang municipal agencies,
- Civic society representatives.

The Living Lab was attended by 9 people representing SMEs (4), scientific units (2), NGOs - civic society representatives (2) and startups and scaleups (1).



During the meetings, topics related to the summary of activities within the Metacities project were discussed, as well as the assumptions of the Joint Action Plan and future activities that should be implemented in order to develop the Metacity concept.

During the workshops, the topic of the catalog of opportunities was taken up, which was prioritized during the project implementation as a JAP assumption. From the perspective of Polish stakeholders, they were prioritized as follows:

- a common, clear understanding of the metacity concept including awareness raising, networking, knowledge exchange activities as a top ranked,
- engagement of business people to validate smart city tech solutions,
- building partnerships and engaging into projects/partnerships for new projects and initiatives,
- supporting XR trials in pilot areas,
- promoting digitalization in a dynamic urban environment.

Attention was also paid to adapting the legal framework and engagement of large, credible actor that should be involved in the development of the metacity concept in the international/regional arena.

The workshop was a good opportunity to present the initial assumptions of the JAP and the discussion. It was an opportunity to compare the needs of the stakeholders with the project assumptions. Moreover, the workshop effectively strengthened the role of Poland as a partner in the Baltic Sea Region strategy, matching local needs to the regional goals of Metacity.