BASELINE STUDY

DECEMBER 2023

metacity

Virtual solutions for real people

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FOREWORD

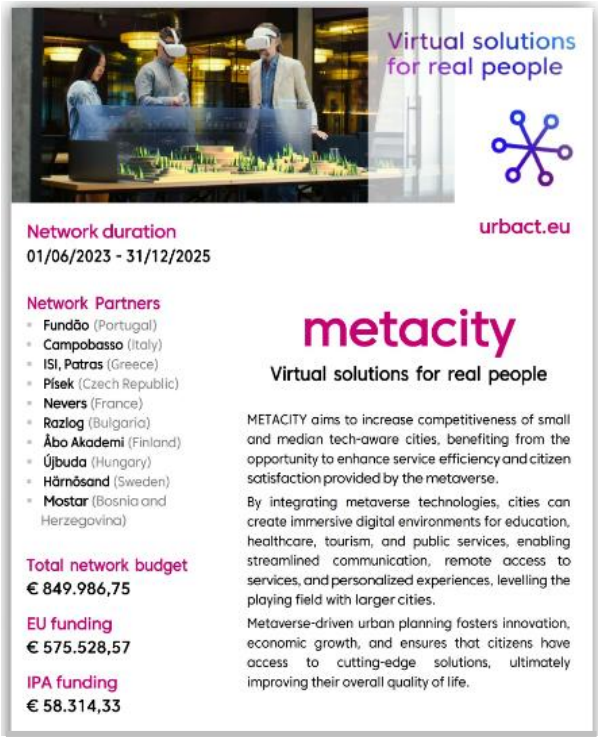
The world is changing fast and cities, being home to 56% of global population and 75% of Europe's, must adapt or even anticipate these changes. From climate change to geo-political instability the challenges to be addressed within the forthcoming years are as unquestionable and numerous as they are complex and difficult to grasp. But amongst all these, one that certainly captures the attention of policymakers and common citizens alike, is the dawn of a new digital society powered by tools such as the metaverse and artificial intelligence, which effects already start to be quite visible today.

As machines progressively replace human voices when we contact public services and we watch the quick grow of virtual reality centres, e-games and immersive experiences all around our cities, we cannot stop asking ourselves how the cities of the future will look like – being that the future is now just around the corner, in a lapse of only a few years. And our local policymakers, more than asking themselves the same question, cannot but to start thinking of how they will turn these tools into their advantage, and use them for better and more sustainable urban planning, while taking heed of all the challenges and threats that they also bring, as do all the major technological evolutions.

It is certainly the time for all of us, local policymakers, practitioners and common citizens, to start addressing these questions and challenges together – before the future catch us with us and changes our lives forever without prior warning.

This must needed co-creation of urban planning is what URBACT allow cities to do – and is precisely what 10 cities and academic organisations in Europe have decided to do within the metacity network. To start now planning how will the metaverse and artificial intelligence impact small and medium cities in Europe and how can these tools be used for these smaller players to challenge the competitiveness and attraction of much larger urban centres.

The present Baseline Study presents the initial scenario faced by these cities at the start of their journey – where do they stand and where do they want to be in this major digital evolution, and how they plan to do part of this path together. The conclusions and plans are presented in this study, but one thing is already certain: it promises to be a fantastic ride!



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01

EU FRAMEWORK AND OVERVIEW OF STATE OF THE ART

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1.0
Introduction

Digital transition is speeding up globally in the wake of COVID pandemic and because of the transformations it induced in our societies and in all kinds of services, and of quick technological evolution that brings us today solutions such as Artificial Intelligence and the Metaverse that even so recently sounded as science fiction. While metaverse may still be seen as a distant reality for most, the disruption introduced by new Artificial Intelligence tools such as ChatGPT in areas like customer service puts the matter very pressingly on today's agenda, and both central and local level governments are now well aware for this new reality.

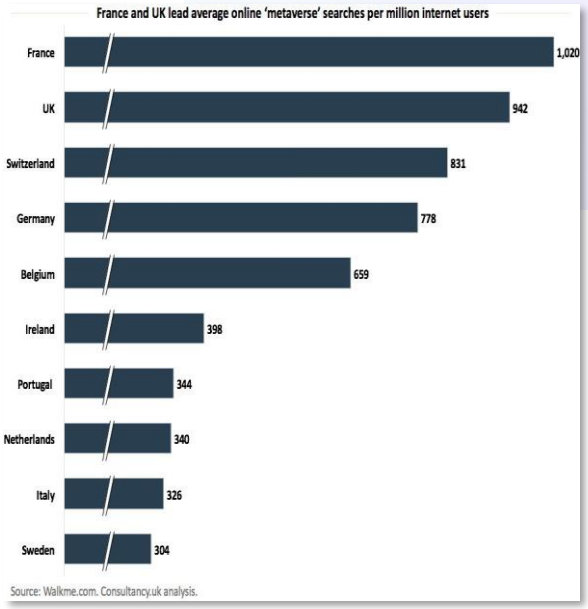
The World Bank[1] has recently outlined that it is not only possible for the metaverse to offer benefits for local economies but also impact very positively the area urban development, while in Europe, the European Commission through its President von der Leyen's on her remarks on the metaverse on the 2022 State of the Union letter of intent, mentioned clearly that "*metaverses operate in real-time, augmented or virtual reality and they cannot be reset or put on hold*".

From scientists to citizens

After entering the lexicon of professionals and practitioners first, and most recently that of politicians and decision-makers, terms like the metaverse and artificial intelligence are now also quickly gaining ground into the normal people's lives and interests, as can be seen by the growing number of searches on the term 'metaverse' per million internet users, although at an uneven pace across Europe, with much more awareness in some countries than in others (see Figure 1).

The European citizens are well aware that digital technologies will change their lives and the way they interact with their governments, employers and fellow citizens – they just don't know when and how and are waiting for their public and corporate leaders to show them.

Figure 1 – Public interest in metaverse in EU



As regards local administrations, the time is now for public services to start thinking about this new wave of digital transformation, not only in terms of technology adoption and ecosystem development but also in terms of ethical, legal and behavioural challenges. The new fully immersive digital world promised by the metaverse and artificial intelligence tools will be very different from the actual, physical one, and nowhere will this be felt more accurately than in urban life, with changes in the way people work, move, use public services and interact between themselves and with their local governments.

metacity is a first opportunity for 10 small and median cities to start thinking together and planning for this brave new world everyone is now talking about, so that citizens can feel its impacts in their urban lives by the end of the decade.

[1] https://blogs.worldbank.org/digital-development/can-metaverse-offer-benefits-developing-countries

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BOX 1

What is the Metaverse and what does it mean for common people?

In quite colloquial terms, the 'metaverse' is a virtual, computer-emulated, universe: a network of 3D virtual worlds focused on social and economic connection, and that may be explored through hardware such as a virtual reality headset.

In the metaverse you can drive a Formula 1 car, sail across the ocean or walk a thin wood board 200 meters high (as in the picture next, taken during the city visit to the Partner City of Härnösand).

But you can also walk through a digital twin of your city and experience – almost as in real life - how new urban developments will be like, and consequently approve or disapprove. As such it may be a crucial tool for citizen engagement and participation.

1.1

The European Union position on the metaverse

On the 2022 State of the Union letter of intent, European Commission's President von der Leyen's stressed the importance of the metaverse as a pressing challenge for the European Union and promised to launch a creative and interdisciplinary movement, aiming to develop standards, increase interoperability, maximising impact with the help of public authorities (including local), IT experts, regulatory experts, citizens' organisations and youth. A '*Citizens Panel on Virtual Worlds*' has been created, consisting of 150 citizens who discussed pitfalls as well as opportunities during 3 weekend session in April 2023, with discussions feeding into the EU's vision on the Metaverse that has been presented in July 2023 with a focus on new standards and governance for virtual worlds.

At this point, the commission isn't proposing any new laws but is pushing for a European technological leadership within these new areas, as Thierry Breton, the European Commissioner for the internal market, said in a statement: "*Today, Europe throws its hat in the ring to become a world leader in Web 4.0 and virtual worlds. Europe has what it takes to lead the next technological transition.*" Before that, in March 2023, leaders of all the EU's 27 member states put "*Web 4.0*" among a shopping list of technologies the union needs to stay competitive, alongside artificial intelligence (AI), quantum computing and 6G internet networks.

The new European metaverse vision, as presented in July, further details the announcements made by President von der Leyen's State of the Union address, with the intent to launch a creative and interdisciplinary movement, similar to the New European Bauhaus, and aiming to develop standards, increase interoperability, maximising impact with the help of IT professionals, regulatory experts, citizens' organisations and youth.

The European Commission has also expressed the firm intention to shape from the outset the development of truly safe and thriving metaverses, and with the EU Digital Agenda, EU has strong and future-proof regulatory tools for the digital space, that must be put into place by regulators at European, national and local level. Financial instruments for the increased competitiveness of European players within the metaverse and AI arena will be available in particular within the funding programme for Research and Innovation, the €95 billion budgeted Horizon Europe[2] mechanism. Expected impacts from the EU strategy should be felt in terms of citizens, companies, public polices and local governance. The Commission intends in

[2] https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe_en

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particular to promote *"open and highly distributed technologies and standards that enable interoperability between platforms and networks and freedom of choice for users, and where sustainability is at the core of technological developments."* The EU executive points to the relevance of existing legislation in privacy, consumer protection, data governance and platform regulation at the regulatory level, and of other technical and social challenges and threats raised by the metaverse (see Figure 2). No regulatory gap to address emerging threats, such as new forms of gender-based violence, is mentioned at this point, albeit it had been addressed in President von der Leyen's letter of intent and is supposed to be under study.

The strategy says the Digital Europe and Creative Europe programmes will support the development of skills relevant to virtual world technologies, whilst research on how the metaverse will impact people's health will be financed under the Horizon Europe programme, with an estimated amount in the order of 200 million euros (see box 2) as well as potential investment via EU regional funds. An initiative to attract highly skilled specialists from outside the EU is also planned.

The EU executive is also planning to deliver a Virtual World Toolbox for the general public in the first quarter of next year, whilst the Better Internet for Kids strategy and the planned code of conduct for age-appropriate design will also cover the metaverse.

Regarding disinformation, the Commission will seek synergies with initiatives such as the European Digital Media Observatory and the Code of Practice on Disinformation.

Figure 2 – Challenges raised by metaverse

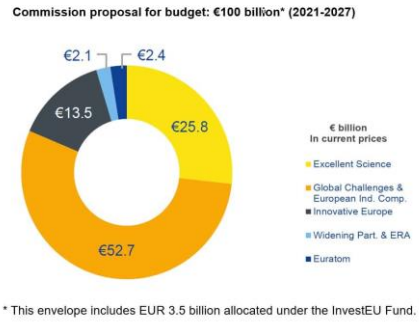
Summary of the metaverse challenges along with their causes and guidelines.

Challenges	Causes
Interoperability	(a) Variations in hardware, software, and network protocols (b) Competing rights, intellectual property, and governance (c) Variations in user behavior and preferences across platforms
Security and Privacy	(a) Lack of privacy regulations (b) Intrusive and extensive data collection (c) Lack of users' data rights and ownership (d) Interpreting current regulations in the metaverse world
Network Capabilities	(a) High responsiveness and high-bandwidth connectivity requirements
Data Management	(a) Various data formats (b) Heterogeneous storage needs (c) Massive amounts of data (d) Lack of data integration solutions
Digital Addiction and Mental Health	(a) Overusing digital devices (b) Obsessively thinking about digital use (c) Replacing face-to-face communication
Law and Jurisdiction	(a) Virtual nature of the realm (b) Anonymity of avatars (c) No traditional institutions with physical premises to fix complaints (d) Difficulty in determining which laws apply to disputes involving intangible assets in the virtual space (e) Anonymous and encrypted virtual transactions
Environmental Pollution	(a) High computing power and bandwidth (b) Requirement for high-quality images (c) The growing use of cloud computing in virtual reality, online gaming, and high-resolution image processing (d) Advancements in VR technology lead to a rise in e-waste

(adapted from "Metaverse applications in Smart Cities" ScienceDirect)

BOX 2

Horizon Europe and funding for metaverse projects



* This envelope includes EUR 3.5 billion allocated under the InvestEU Fund.

Horizon Europe is the EU's key funding programme for research and innovation with a budget of €95.5 billion for a period of 7 years until 2027. It tackles climate change, helps to achieve the UN's Sustainable Development Goals and boosts the EU's competitiveness and growth in all sectors including emerging areas as artificial intelligence.

The programme facilitates collaboration and strengthens the impact of research and innovation in developing, supporting and implementing EU policies while tackling global challenges, such as the emergence of the metaverse, with an allocated budget of approx. €50 billion. It supports creating and better dispersing of excellent knowledge and technologies and should support projects in the metaverse from cities and companies, with at least €200 million through competitive calls to be launched from 2024 onwards.

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For companies, the strategy points out that the EU has some promising regional hubs highly specialised in areas such as 3D modelling, gaming and Virtual Reality. However, *"the ecosystem is fragmented and faces challenges related to the uptake of new technologies and access to finance"* as it is mentioned in the document published in July.

The Commission is 'exploring' with EU countries to establish a new partnership with relevant stakeholders to develop an industrial roadmap to invest in cutting-edge technologies, European data spaces, and the Next Generation Internet initiative. A more concrete initiative envisaged is the establishment of regulatory sandboxes on virtual worlds and Web 4.0 to provide businesses with a safe environment where to test new technologies and innovative business models. At the same time, regulators would learn about relevant aspects of the virtual worlds, like the tokenisation of virtual assets.

In addition, the Commission will launch a study to analyse the business opportunities and practical barriers of these new technologies and create a toolbox to fight counterfeiting, with the view of giving Intellectual Property holders guidance on how to enforce their rights in the metaverse.

A critical concern for the metaverse is that Big Tech companies might create closed ecosystems, so-called walled gardens, to keep the users in. Thus, the EU executive also committed to engaging with standard developing organisations to ensure the interoperability of virtual worlds, which is in line with President von der Leyen previous comments.

Public policies including local authorities

The strategy document notes that the Innovation Friendly Regulations Advisory Group will inform future actions for delivering public services in the metaverse. A call for a new large scale EU project, the *European CitiVerse* has already been launched to help local authorities optimise city planning and management and new European Digital Infrastructure Consortia are envisaged in areas such as language technology and blockchain, with an expected start of activities in 2024.

Another project relates to developing a European Virtual Human Twin to replicate a human body with the help of supercomputers digitally and providing access to healthcare researchers. The idea is to inform clinical decision-support systems, personal health forecasting tools and personalised medicine. Also, within the EU missions for climate change, several projects are being supported that include the development of Digital Twins for cities and regions to address climate change impacts and engage citizens (see e.g. the Resist[3] project) and a specific 20 million € initiative to support the development of a local digital twin toolbox to advance smart communities[4], has been launched very recently by DG CONNECT and should produce results from 2025 onwards.

The Commission will launch an expert group with national representatives to share best practices on Web 4.0 while engaging in international fora, like standardisation organisations.

It also vows to "*support the creation of a technical multi-stakeholder governance process to address essential aspects of virtual worlds and Web 4.0 that are beyond the remit of existing internet governance institutions.*" A structured approach to monitor market and technological developments in the metaverse is also envisaged and will involve the recently established European Centre for Algorithmic Transparency.

Figure 3 – A EU project on virtual tools

The €25 million Horizon Europe funded RESIST project is developing Digital Twins in 12 EU regions to help them adapt to Climate Change and its impacts, in an example of virtual tools.

[3] https://resist-project.eu/
[4] https://ted.europa.eu/udl?uri=TED:NOTICE:438605-2023:TEXT:EN:HTML

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1.2
Metaverse for Urban Authorities

Digital Transformation has been on top of Local Sustainable Development agenda for some time, with the pandemic considerably speeding up this process and forcing local authorities to take the digitalisation route for services and processes. Already before the pandemic, and as shown in the ESPON Study on urban dimensions of digital transition in Europe[5] (see Box 3) it was clear that digital transition had started to reshape public services with very significant impacts. The pandemic has strongly accelerated this process. Citizens have quickly learned how to participate in meetings online and how to engage with their authorities remotely, and now expect to continue to be able to accomplish nearly anything that they need online and demand for local authorities to pivot and evolve their offerings into that sense.

And while local authorities have, during the pandemic, risen to the challenge of delivering public services remotely, the whole situation also exposed insufficiencies and inequalities in digital service provision across the local public sector. There is still a clear disparity between the ambitious digital transformation strategies launched by the EU and central governments and the resources of most local authorities. Furthermore, the pressing demand to move existing services online in early lockdown may have embedded old working practices into new systems which would benefit from reimagining services in an entirely new way and with new technology. The rapid digitisation brought on by COVID therefore demands thinking more thoroughly about strategic, longer-term innovation and investment in local digital service provision, especially considering the new digital wave that is currently awakening with AI tools (as ChatGPT) and the emergence of metaverse. Smart tech-aware cities, both large and small, must start to plan now for the tools of tomorrow, and no other concept is as appealing as the AI-powered 'metaverse', deemed by many to be the future of society. Given their proximity to citizens, local authorities must play a key and early role in using the metaverse for the common benefit, either through regulation, induced diversity of technological suppliers or multiplicity of services. The potential to untap is huge: from urban planning to climate change and natural disaster mapping, digital twins in the metaverse —a virtual model designed to accurately reflect a system or location—are clearly beneficial for governments. Also, the internet-of-things (IoT), a term that refers to devices loaded with artificial intelligence and edge-computation, is another aspect of the metaverse that can clearly be leveraged for the public's benefit.

Metaverse for urban development

Urban development answers "*questions about how people will live, work and play in a given area*," facilitating the development and design of land use to provide accommodation, transportation, communication, and distribution networks. While the use of the metaverse for urban development is still in an experimental stage, there is a growing consensus that it can support urban planning by providing a more data-driven process to urbanization, opportunities to experiment with new, creative and sustainable designs and offer a digital playground for testing prior to execution, expanding the 'Digital Twin' principle into a much more 'hands-on' approach through virtual life experiences. The metaverse, and AI tools like ChatGPT, can also be used to enhance and enrich digital interaction experiences between citizens and city officers, extending the effective concept of remote services started during the pandemic to enable human interface and dialogue in metaverse meeting rooms using avatars – in a more futuristic version – or simply with the use of ChatGPT to speed up responses to common queries, in a more practical use.

[5] https://www.espon.eu/sites/default/files/attachments/ESPON%20working%20paper%20on%20Digital%20Transition.pdf
The cities questionnaire used for the Activation Stage of the **metacity** has reproduced the bulk of this ESPON survey, allowing a comparison of results within the network with a broader EU picture, provided in Section 2.

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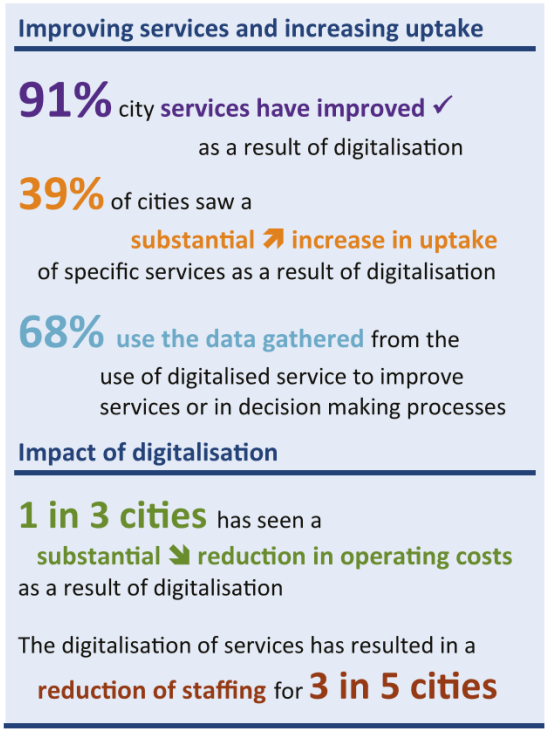
BOX 3

ESPON Policy Brief on Digital Transition



ESPON (www.espon.eu) is an EU funded programme that bridges research with policies, providing territorial analyses, data and maps to support EU development policies –and particularly Cohesion Policy- with facts and evidence, and help public authorities to benchmark their region or city, identify new challenges and potentials and shape successful development policies for the future. All its content is publicly available on their website to download it and use it and can be a very useful tool for urban practitioners.

The ESPON Study on urban dimensions of digital transition in Europe (2018) gathered 136 responses from all the EU Member States as well as from Iceland, Norway and Switzerland during 2017, with half of the responses coming from small and medium-sized towns (fewer than 50,000 inhabitants) as those represented in **metacity**, being an extremely useful comparison point for this network. In the results it was clear that digital transition had already started to reshape public services before the pandemic, with very significant impacts. Within the main findings of this study, was that nine out of ten cities report that their services have improved as a result of digitalisation. The uptake of digital solutions shortens the time and lowers the cost of obtaining information and carrying out administrative procedures. Two in three cities have seen an increase in the uptake of specific services as a result of digitalisation and two in five even a substantial increase. Over two-thirds of cities use data gathered to improve services or in decision making processes, and the digitalisation of services has somewhat or substantially reduced operating costs for 85% of cities.

Some cities already are deploying metaverse technologies such as augmented and mixed reality, the Internet of Things, digital twins and blockchain to help them with municipal functions ranging from tourism to resource management. The next step will likely see increased exploration of the metaverse as a tool to improve and expand resident engagement and streamline digital government services, for which local entities will likely need buy-in from a wide range of stakeholders. The challenge for cities is to quickly grasp how these tools can be used to address specific and general urban planning and service needs, to ensure that developed metaverse technology and content will take place in a manner that is well-regulated and stands to benefit their populations. That challenge is pressing, as technology doesn't wait, and is especially relevant for small/median cities that have less negotiation power with mega tech corporations and must work harder to attract and satisfy their citizens then larger cities.

A second step of the metaverse urban planning process would be to assess the possibility of using the metaverse as an expanded digital twin for cities in a near future, using cities digitized versions to visualise and facilitate infrastructure and development, test new ideas, technologies, and capabilities, and identify improvements for all aspects of urban living. By making this technology accessible to citizens and not just the corporations and agencies responsible for making these changes, these processes could further open

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the urban planning process to a greater citizen participation, allowing them to see the impact of changes and to feel more included. Several funding programmes at EU (e.g. Horizon Europe) and national or local level already include this possibility to develop Urban Digital Twins, and cities must plan ahead for making the most of this funding streams, building on benchmarks as that of Tampere, showcased within metacity 1st Masterclass.

The Tampere benchmark

The developments taking place at Tampere resulted in the publication "Tampere Metaverse Vision 2040[6]" that investigates how a metaverse environment composed of various intelligent technologies can be utilized as support for the happiness of citizens, urban governance, sustainability, equality, well-being, and healthcare. This vision offers a glimpse into what the city could become in the 2040s and depicting a future Tampere where artificial intelligence enhances citizens' well-being by enabling more efficient solutions and personalized services, particularly in education, well-being, and urban environments.

The metaverse could also provide a solution for achieving a carbon-neutral city. By utilizing digital twins that model the real world, various alternative perspectives can be simulated. This enables authorities, stakeholders, and city residents to test the impact of their everyday choices on people, economy, and the environment. The vision also envisions that in two decades, metaverse could facilitate tailored housing solutions for individuals and improve citizens' sense of safety and security.

In this future urban vision, citizens have increased opportunities for influencing decision-making processes. Metaverse has the potential to usher in more participatory urban governance, leading to services that more effectively cater to people's needs.

The future vision for Tampere emphasizes the impact of metaverse on the economy and equality.

The vision outlines a scenario for the 2040s where companies, tourists, and immigrants can explore the city, learn the language, and engage with business stakeholders even before physically arriving in the city.

Figure 4 – Tampere Metaverse Vision 2040 as a benchmark of metacity

"This Tampere vision development and the already on-going efforts to make the city more friendly through the use of technology are being possible already today because well aware policy makers were smart enough to plan and budget for these efforts well in advance."

Tiia Joki, Development Manager for growth, innovation and competitiveness at City of Tampere, during the 1st metacity Masterclass on October 2023.

The city of Tampere, its Metaverse vision and the fact that it resulted from a careful planning made well in advance, make a clear benchmark for the metacity project partners as they start the Planning Stage of their Action Planning Network.

1.3 Metaverse technologies and applications

The path of urban authorities towards the metaverse will not be without difficulties. Investing in the metaverse will not be a low-cost or easy undertaking and requires a grasp of lower-level technologies such as IoT or service digitalization, in order to obtain and process the data necessary for the artificial intelligence to do its work, and also calls for skilled people, to implement the new technologies, which are hard to find.

It's a new a more challenging step of Digital Transformation, that for most cities started with the launch of webpages and promotion of public internet spaces in the early 00's, followed by Internet of Things (IoT) and later smart city strategies already in this decade, before starting to plan the move to the metaverse in the next one(s) (see example of Tampere in Figure 5).

[6] https://www.tampere.fi/sites/default/files/2023-08/tampere_metaverse_vision_2040_web.pdf

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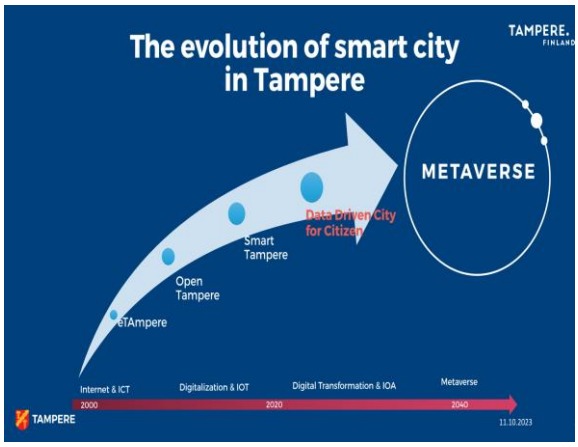
Figure 5 – From the internet to metaverse: the example of Tampere



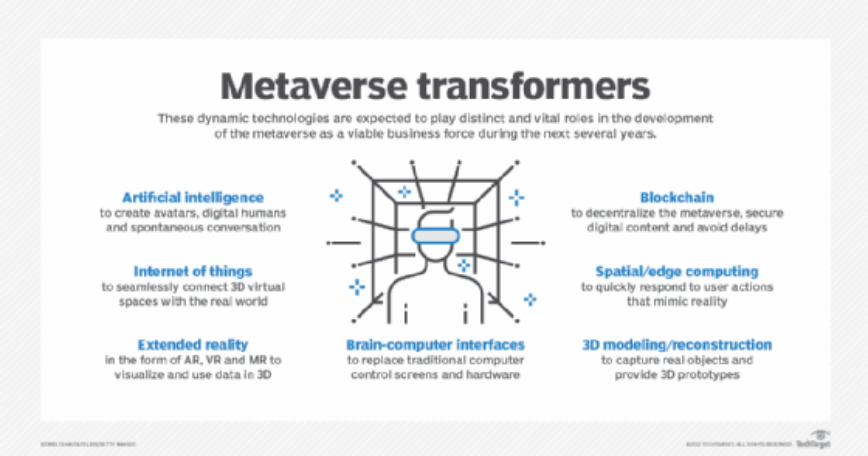
To avoid that this last leap into the metaverse is a jump into the unknow, urban authorities must become familiar with the metaverse main '*transformer*' blocks and define a strategy around them. Some of these may already be familiar to the city planners, practitioners, and citizens, while others must still be developed. For this, cities may need to define priorities in terms of both application areas (e.g. mobility, tourism, urban planning) and technologies, as not all cities will be able to cope with everything at once. The URBACT planning process can be important in this prioritisation process.

But there clearly are some areas where local policy can be taken quickly and with limited resources. One is to develop programmes and studies to assess (with citizens participation) which specific public services – especially in areas such as education and tourism - and cultural/social/economic events can be made available in the metaverse, within a foreseeable future (3-5 years), and how, by assessing needs in terms local development and deployment of underlying technologies, including sensors, real-time interaction and blockchain. Small-scale experiments using affordable solutions as ChatGPT for automation of some user-interface services can also already be tested at local level. This can be an important first step towards a more iterative approach to leverage the metaverse for urban/city planning as opposed to plunging headfirst into a relatively new technology or relying entirely on vendors' solutions.

For cities more advanced in the process of '*smartization*', options like 3D Digital Twins for modelling of the city or city areas and advance urban planning and the development of "metacentre/ virtual reality centres" using technologies such as extended reality, spatial computing or brain-computer interfaces in order to start providing citizens access, are other possible paths towards a full metaverse immersion, and some examples of these are already available within the metacity network (and are knowledge areas/ benchmarks to be further exploited in the next stages of the project) .

BOX 4

The metaverse transformer blocks



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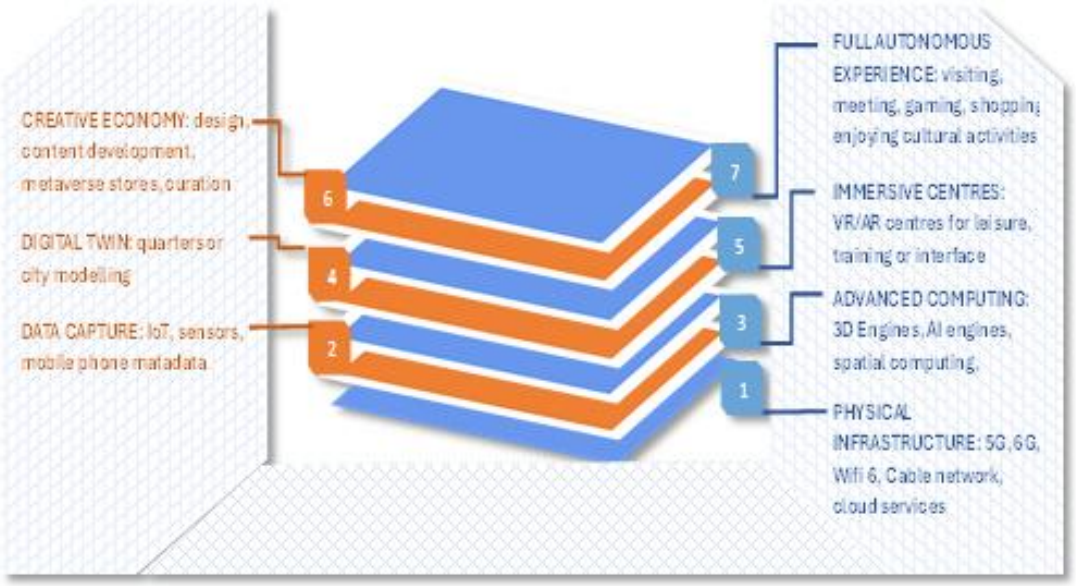
Each time a city masters a new transformer block and uses it or makes it available within its range of public services, it is taking another step towards a fully immersive metaverse future. The first step, or transformation layer, is that of the physical infrastructure – in terms of cable networks, 5G and 6G mobile networks and cloud services – that will support the use of the metaverse by citizens, public services and corporations.

The second one will be that of data capture – for future metaverse use – using Internet of Things, sensors and mobile network metadata. These two initial steps have already been accomplished, or at least initiated, by most cities in Europe and by the generality of the metacity partner. The network builds on tech-oriented cities and organisations in Europe that while in different level of digitalization and '*smartization*' have all already started the path of urban digitalization– and even lead it in their own countries, in areas such as IoT.

The following steps are more challenging and will make the bulk of the planning actions to be developed within metacity. They include the set-up of advanced computing facilities such as spatial or edge computing and blockchain technologies, which will in turn enable the development of 3D models such as digital twins of city areas (or of the whole city) that can be used e.g. for urban planning.

The final steps include the development of immersive centres, where users can enter the metaverse and access its services (while the technologies to do so are not yet available from home), the fostering of a creative economy that will design, develop and deploy the new metaverse services, both public and private – including shops, museums, cultural centres – and finally the deployment of a fully immersive and virtual reality where all (or nearly all) urban experiences, facilities and services are available in the metaverse and feel as real as the real thing. This step-by-step process is pictured in Figure 6.

Figure 6 – Urban metaverse transformation process



The metacity context

Within the metacity network, cities like Fundão, which has successfully led the IoTXchange APN under URBACT III for IoT immplementation in urban contexts, Písek - which has developed a top-class cloud infrastructure, Härnösand or Nevers, that have already developed digital twins or host virtual arenas, have already accomplished part of these steps and are now ready to embrace future challenges, and offer relevant benchmarks from within the network that can serve of inspiration to other partners.

Other cities around the world are already moving towards the next step, and may be external benchmarks for our partners: in addition to Tampere, that has developed what is entitled as "*The World's First People Centred*

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Metaverse Strategy" that has already been showcased in our network's 1st Masterclass during Activation Stage, Singapore has introduced an AI tool called 'Pair' to speed up common tasks like drafting policy papers, summarising news, answering citizen queries, or getting the gist of long documents in seconds, and Seoul has announced plans to deliver a variety of metaverse-based public services and events already by 2026, hoping to host metaverse-based festivals, attracting virtual tourists worldwide and let residents meet virtually with avatars of public officials instead of travelling to city hall.

Both Seoul and Singapore are large metropolis with resources far above that of metacity partners, but that be taken as inspiration for smaller actions adapted to the project partners reality. On the other hand, Tampere, while still twice as big as the larger cities on the network, is a more similar example to metacity partners, and will be considered as the main external benchmark for our partners.

What all these examples show without a doubt, is that this is a prime time for public authorities to consider how do they want to shape urban metaverses, and EU cities must jump into this wagon while it is starting instead of simply 'wait and see'. Like in other digitalization waves before, small/median cities must be agile and move fast, profiting from their smaller scale, simplicity of processes and higher flexibility, to be amongst the first to plan, experiment and set the rules for the public authorities' use of metaverse and this way increase their competitiveness as regards larger cities with each they compete for attracting investments and talents.

The metacity network will address this pressing challenge within the context of a group of tech-aware small/median cities and universities in Europe that wish to move forward with the path of Digital Transformation into the technologies of the future and embrace the use of new technologies to improve the quality of urban life, while taking heed of all the threats and challenges posed by this quick evolution.

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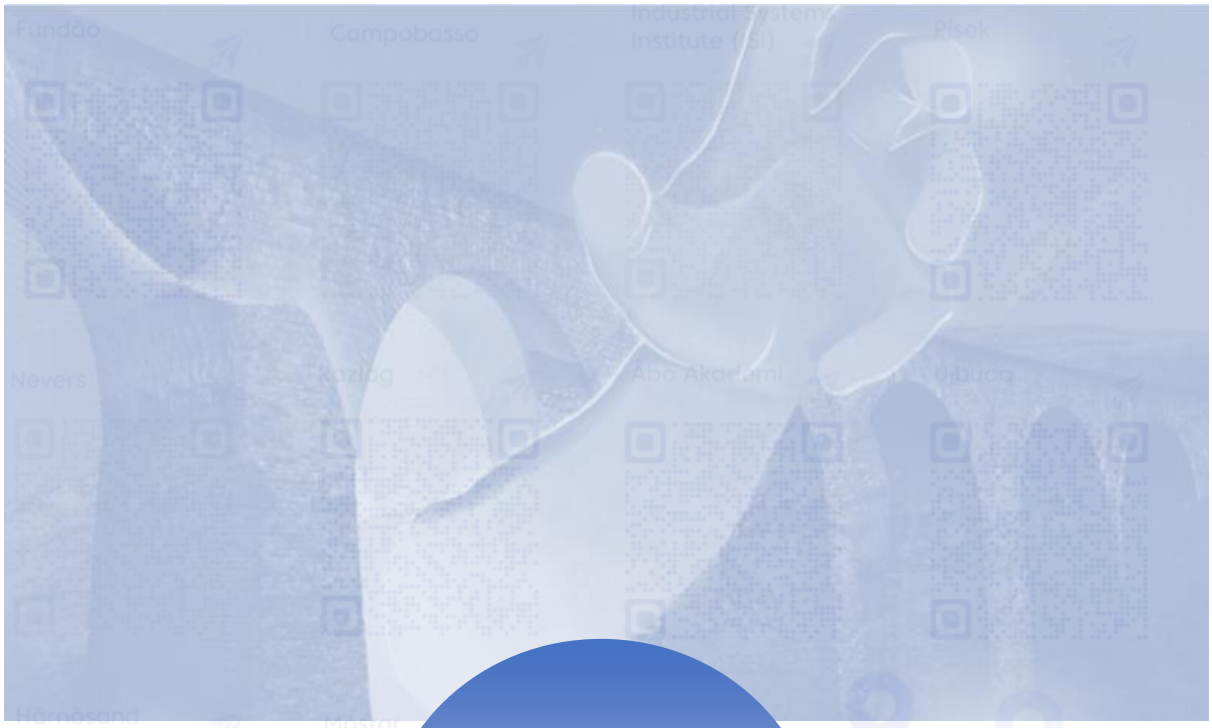

02
CITY PROFILES

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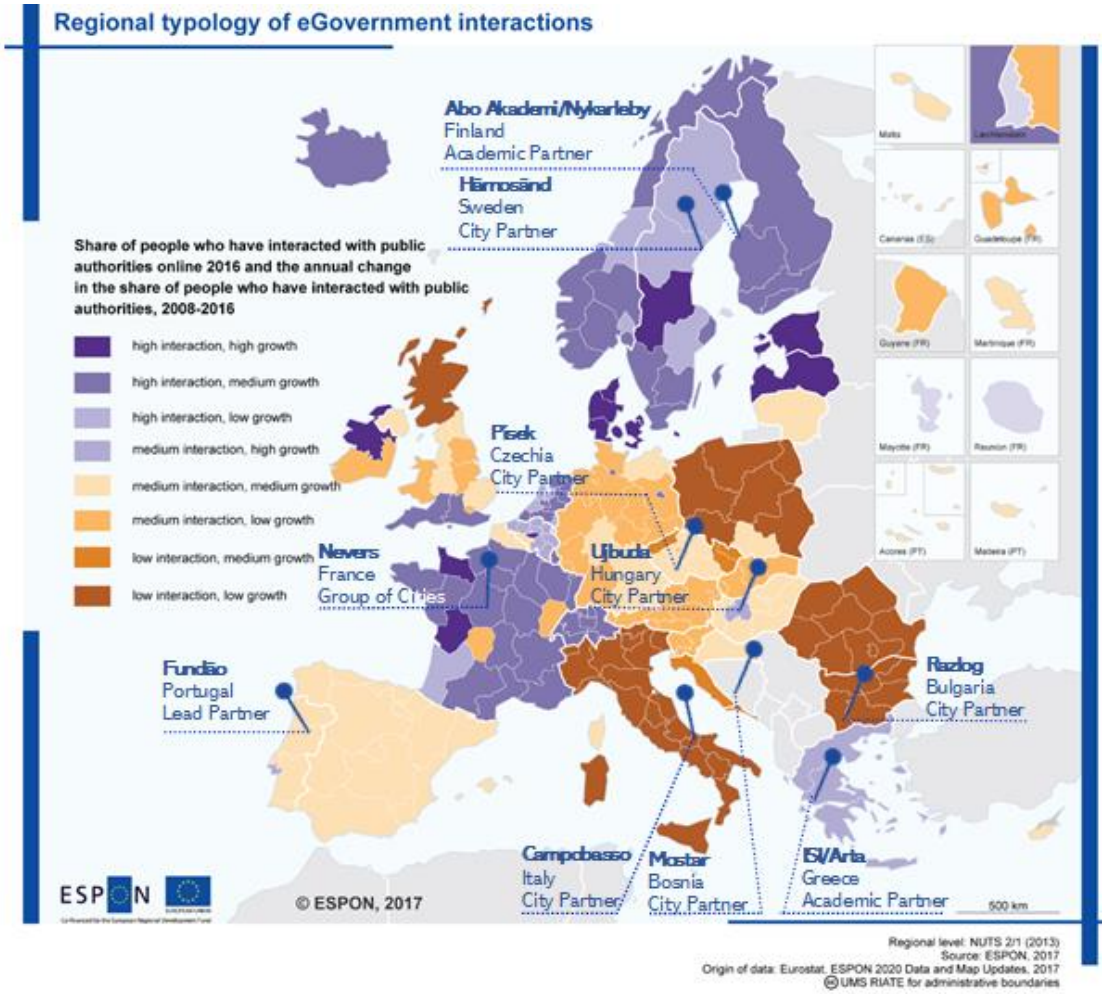
2.0
The metacity network

The metacity network has been developed as a balanced group of entities directly engaged into Urban Development, with a balance sought both in geographic terms and in terms of level of development according to the European Regional Development Fund classification (following the URBACT rules), but also in terms of typology of eGovernment interactions, which is particularly relevant as a starting point for the present topic of city services in the metaverse and using state of the art IT tools. For this last criterion, the ESPON classification (dated from 2017, which is the most recent one available) has been used, with a desired balance in terms of cities located in regions classified with low interaction (as is the case with Italian or Bulgarian regions), medium interaction (as in Portugal, Greece or Czechia) and an already high level of interaction between citizens and eGovernment services, as in the Nordic countries and France. The map with the location of the metacity partners and their typology of eGovernment interactions is presented below in Figure 7.

Figure 7 – The metacity network in terms of eGovernment level of development



While with different levels of development and digitalisation, all metacity partners are similar in size and can be classified as small or median size urban areas, being as such highly dependent on the success of their digitalisation strategies in order to remain competitive and attractive in comparison with larger cities and metropolitan areas that are located in their close neighbourhood. The main figures are presented below in Table 1.

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Table 1 – The metacity partnership in a glance

Country	Partner	Type	Size	Level of Development (ERDF)	Typology of e-government interactions (ESPON)
	**Åbo Akademi**, working w/ City of **Nykarleby**	Academy	7.497	Transition	High interaction / Medium growth
	**Campobasso**	City	47.587	Less Developed	Low interaction / Low growth
	**Fundão**	City	26.509	Less Developed	Medium interaction / medium growth
	**Härnösand**	City	25.000	More developed	High interaction / Low growth
	**ISI Patras**, working w/ City of **Arta**	Academy	41.600	Less developed	Medium interaction / high growth
	**Mostar**	City	104.518	IPA country	Not available
	**Nevers Agglomération**	Grouping of cities	64.617	Transition	High interaction / medium growth
	**Písek**	City	30.724	Transition	Medium interaction / medium growth
	**Razlog**	City	18.966	Transition	Low interaction / Low growth
	**Újbuda**	City	144.880	More developed	High interaction / Low growth

The **metacity** partners have already started the digitalization process. Fundão has led the IoTXchange APN network of URBACT III, leading a group of 8 cities in the adoption of integrated action plans for the use of IoT for public services, and all other partners have started IoT implementation and/or digitalization of services within their territory.

With their previous efforts, these group of tech-aware cities has set the initial layer for a faster uptake of a new wave of digitalization, making full use of immersive and intelligent technologies, which can provide a much more enrichment experience to end-users and contribute to bring them closer to their local governments, even when the interactions are remote.

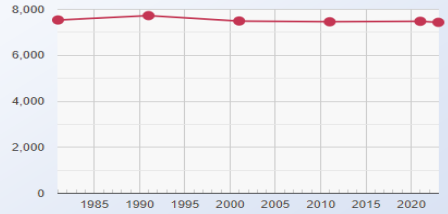
By establishing the link between past initiatives in the digital and IoT areas of its city partners, and their ambition to compete with the "*major league*" cities for quality of urban service and attractiveness of talent and tech know-how, **metacity** will offer a unique test-bed for the intervention of local authorities in the metaverse design, regulation and use for common good, aligned with the strategic objectives of the EC and its Digital and Urban Agendas, and with support from academic/research partners in the network and in the local context.

For the partner cities, presented in this section, **metacity** will therefore be a landmark step in the evolution of from the present level of digital services – which is assessed for each city in the following pages - to a full metaverse where each citizen is represented by a digital persona and has full virtual access to a range of public services in areas such as social care and welfare, education, transport, road and parking, culture or tourism.

2.1
ÅBO AKADEMI, working w/ the city of NYKARLEBY

Population Size	Density
Population 7497 (31.12.2021)	10-50 pop.density: Per./km2

Population evolution:



City Overview

The project partner Åbo Akademi University (ÅAU) will be working within the metacity project, and for the development of an Integrated Action Plan on Urban Development, with the neighbour city of Nykarleby. Nykarleby (in Swedish, Finnish: Uusikaarlepyy) is a town in Finland, located in the Ostrobothnia region on the West coast, with a population of about 7,5K. The municipality is bilingual, with the majority of its population being native Swedish speakers.

The new city administration has set up the ambition to reach 10K inhabitants both by attracting qualified immigrants for the local economy and by regaining for the city young population that has departed to go study or work elsewhere.

Nykarleby is known for its strong entrepreneurial spirit, which can be noted in aspects as the vibrant small business culture and the unique fur industry to world-leading corporations like Mirka, known for its surface finishing products and recognized as a global technology leader in its industry, and Prevex. Starting in high school, local students can choose a specialized line in business knowledge and collaborate with the local business community, and the city is committed, through an active business policy, to create favourable conditions for both small and larger companies.

Nykarleby's digital shift began in earnest in the mid-2010s, paralleling many global cities' trajectories. The city, always progressive, launched initiatives, such as a municipal web shop project and an app for mobiles, emphasizing technology's role in urban development. However, the local digital ecosystem is limited and without major players.

The 2020 COVID-19 pandemic highlighted the city's digital evolution's cruciality. As physical interactions dwindled, the need for digital platforms surged, leading to enhanced e-governance and a swift pivot to online platforms for schools. By 2021's close, Nykarleby had adapted, showcasing that digital transitions are vital for cities aiming for resilience and growth.

in 2024, and for the first time ever, a participatory budgeting / resident budgeting will be developed where residents will have the opportunity to vote for different suggestions or come up with their own suggestions. For 2024, the city's investment budget also includes a reservation (50 000 €) for digital LED signage that can be used for different marketing and information purposes and can become a vehicle for other digital projects. The city is also considering different plans for the major square that require citizen engagement and could benefit from advanced digital tools, such as VR/AR simulation or a comprehensive digital twin.

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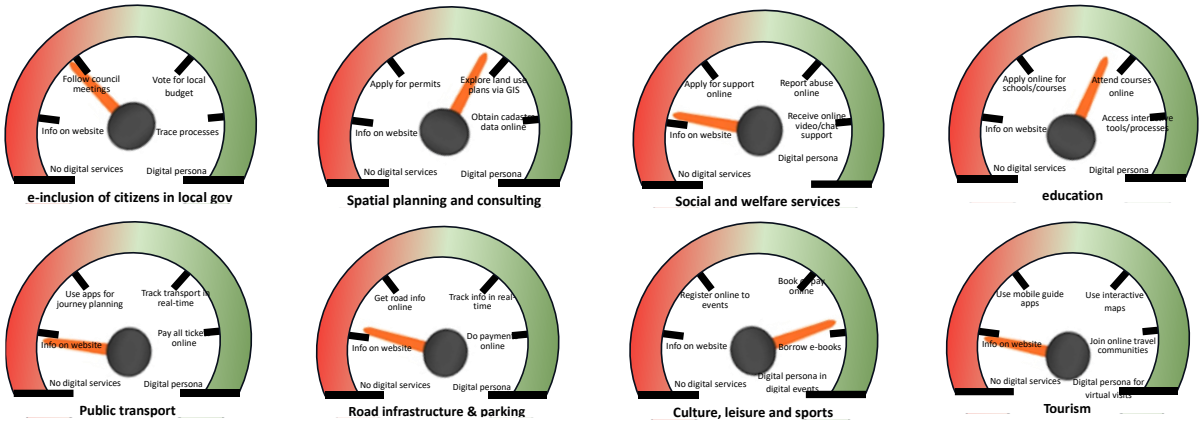
Box 5 – Nykarleby analysis

Main assets and opportunities:	Main weaknesses and challenges:
01 The city's level of ambition and political commitment from the new executive, expressed also in the participation in the 1st CNM	The limited critical mass of the city, in terms of people, financial resources companies, major stakeholders 01
02 Strong digital literacy within population and city administration	Financial constraints and human resources challenges 02
03 The collaboration already established with ÅAU, with proven results in online collaboration BENCHMARK	Lack of strong local players in the digital area 03
04 A strong sense of community and good levels of citizen engagement and willingness to contribute to public welfare	Distance from major centres, which limits the city's attractiveness to both talent and new investments 04

Current level of digitalisation of public services (based on self-assessment questionnaire)



Nykarleby metacity assessment

While participation in the programme and the application of the URBACT methods and tools can be impacting in all cities, its importance in smaller cities can be of particular significance. This was visible in past projects in cities such as Razlog and Kezmarok, and also in Nykarleby participation in IoTXChange, already through the hand of ÅAU as project partner. But now, with a new political executive and a clearer orientation towards digital strategies, the impact of metacity in the city of Nykarleby can be even higher. There are several aspects within the city's strategy that can benefit from the project activities:

a) at a more general and strategic level, metacity can be an opportunity for the city of Nykarleby to develop a first comprehensive Digital Strategy, supported by ÅAU and by a strong ULG, that serves as orientation for the implementation of digital actions within the next 5-6 years.

b) metacity can also contribute – including through funding of testing/small-scale actions and citizen engagement through the ULG – to planned activities such as the participative budget (which can be implemented through digital means) or the development of new plans for the major square, including through the use of testing/small-scale actions to promote awareness (e.g. a demonstration event) or solutions (an open call for ideas, a VR/AR simulation).

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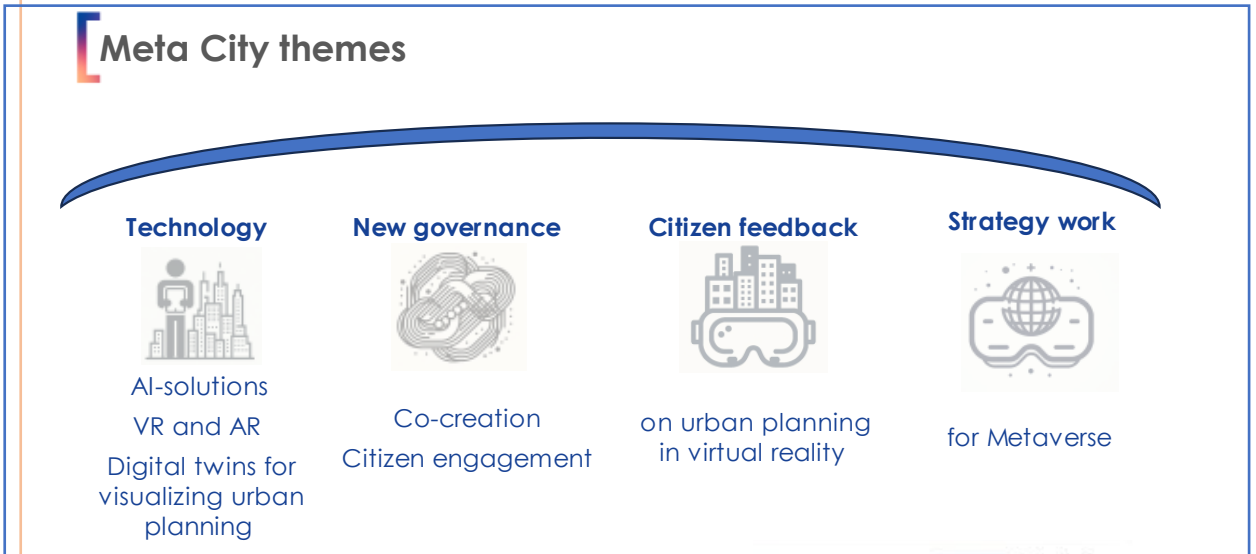
c) on a separate level, the ÅAU experience on citizen engagement should be earmarked as a benchmark of the network that can be explored also by other PPs through a case study development, bilateral visits or other actions to be planned for the network next stages.

Table 2 – ULG proposed composition

	Name	Organisation
01	Päti Eriksson	Youth council
02	NN	Council for seniors
03	NN	Association for companies chairman
04	NN	Citizens living in the city
05	Katarina Bjurs	Senior high-school Topeliusgymnasiet
06	Yvonne Backholm, Sören Andersson	Åbo Akademi University
07	NN	Novia University of Applied Sciences

Figure 8 – The Nykarleby 2028 (post Action Plan implementation) Vision:



- Urban Planning: By 2028 Nykarleby will be equipped with state-of-the-art Digital Twin technology to allow urban planners to visualize new projects and engage citizens to provide feedback.
- Co-creation and citizen engagement: Using both the digital twin and other immersive technologies, citizens will be called to participate actively in the city new developments, and the new main square is an example of this co-creation following a process where citizens, and in particularly youth, were called to define the purpose and form of the new city centre.
- Metaverse Strategy: starting with **metacity**, Nykarleby has now developed a Digital Strategy for 2040, building on benchmarks such as Tampere and guiding the city into the use of new technologies.

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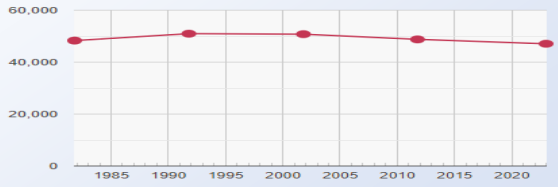
2.2
CAMPOBASSO

Population Size	Density
47.587 (2022)	838,18 ab./km²

Population evolution:



City Overview:

Campobasso is a median city of about 50,000 inhabitants, which is also the capital of Molise region in South Italy, the newest (formally created in 1970) and the second smallest region in Italy, covering 4,438 square kilometres and with a population of 313,348. While Molise economic profile is dominated by the farming industry with small and medium-sized farms spread widely throughout the region, Campobasso's economy is based on the tertiary sector, with an industrial sector characterised by SMEs in the food processing sector.

The city hosts about 5170 companies, a number that has grown about 3,5% in the last 10 years, but mostly in the four-year period between 2016-2019; in recent years, on the contrary, also due to the serious crisis linked to the spread of the Covid-19 pandemic first and the increase in raw material prices following the war in Ukraine then, the number of companies has been steadily decreasing. Of the total number of registered companies, only 176 are listed under the ICT sector, with another 313 listed as sciences activities.

These two sectors, which are the most relevant for the metacity project, represent about 10% of the total number of firms.

A very relevant factor in Campobasso is that the city hosts the main campus of the University of Molise (Unimol). The University of Molise counts 3 University campuses and 9000 students (mostly located in Campobasso central campus), 105 PhD students and about 600 among teaching and non- teaching staff. The university is equipped with several laboratories, multimedia and language labs, central and departmental libraries, and a sports center.

Unimol is composed of 6 Departments: Agricultural, Environmental and Food Sciences; Economics; Humanities, Education and Social Sciences; Biosciences and Territory; Law; and Department of Medicine and Health Sciences, which includes a digital area with focus on the application of IT to the health sector, which is the most relevant area for the project.

The innovation strategy of Campobasso is currently very much linked with the large scale MolisCTE (House of Emerging Technologies) large-scale project, funded by the central government (Ministry of Economy) with about 9,5 million euros as a mobilizing initiative to gather the main local stakeholders for an innovation transformation of the city and region.

The project is focused on demonstration activities (living lab), open innovation (collaboration between stakeholders) and technology transfer initiatives around 2 vertical areas: Smart City and Services for citizens and companies; and Health, Wellness and Wellbeing.

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Box 6 – Campobasso analysis

Main assets and opportunities:	Main weaknesses and challenges:
01 Positioning as capital and flag carrier of the Molise region, an autonomous region of >300K inhabitants with its own regional programme and voice towards national and European authorities	Digital strategy too focused on the MolisCTE project, with a greater focus on mobility, tourism and health and with uncertain sustainability and impacts at city public services level 01
02 Host of University of Molise with 9,000 students and 600 teachers	Ageing population, possible resistance to change and new technologies 02
03 MolisCTE project as mobilization factor of local stakeholders for innovation	Stagnation of entrepreneurial growth, low start-up activity 03
04 Good internal structure at Municipality, with an IT office and project management office (each with 2 people)	Lack of a relevant IT cluster in the city, and of an Information Technologies / engineering department at local university 04

BENCHMARK

Current level of digitalisation of public services (based on self-assessment questionnaire)

Campobasso metacity assessment

The City of Campobasso has a series of assets that place it very adequately within the metacity project: it is a partner of the MolisCTE mobilizing project that has a core group of partners that offer a solid basis for the ULG, and a set of activities that can contribute to the metacity aims; it is host of a university with a good capacity in terms of technological development and that acts as a talent attraction factor; and is the capital of a region with good access to regional funds, in addition of having a sound internal structure that can help in the capture of further national and EU funds. However, the city does not have a clear digital transformation strategy, with activities in this field mostly focused in the mobility area, both within MolisCTE and in past projects (e.g. smart parking). It does not have a digital twin project, nor an advanced e-services portal for public services and it has an ageing population which level of digital literacy is not well assessed.

In order to maximize the impacts from the metacity project and be able to advance to a relevant and impactful Integrated Action Plan that delivers the network aims of enhancing public services for local population by use of new digital tools, it is important that Campobasso clearly defines the key intervention areas. A logic choice will be to focus on Smart Mobility and also on (public) Health Services, building on the experimental and tech transfer activities of the MolisCTE project and on the capacity of the local university department of Medicine and its

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digital group, which can lead to more solid planning for future activities and faster uptake of results. But even in this case, it is important to clearly differentiate between the metacity and MoliseCTE project activities, and to enlarge the ULG – and subsequent co-creation of actions for the future ULG – to other partners, including especially IT companies (also beyond the city and region) and end-user associations.

A more ambitious option is to focus on what the city doesn't have yet, such as (immersive) Digital Twins for Urban Planning and civic participation, on what Campobasso can learn from the experience of other partners, such as Härnösand. This is a more long-term road, and that would imply outreaching to a larger number of organisations for the ULG, but that can have wider impacts in the future. Both options are valid, but a choice must clearly be made as soon as possible (and always before the end of the Activation Stage), in order to take define the ULG and take the maximum advantage of the next phases of the project.

Table 3 – ULG proposed composition

	Name	Organisation
01	Ufficio informatizzazione del comune di Campobasso	Department in the Municipality of Campobasso
02	University of Molise	University
03	Molise Region Authority	Public authority
04	Province of Campobasso	Public authority
05	SEA	In-house company for recycling waste
06	Chamber of Commerce	Public organization
07	Sviluppo Italia Molise	In-house company of the Molise region
08	Professional and trade associations	Associations
09	GAL Molise Verso il 2000	Local group of Action
10	Just Mo	Association for tourism services
11	ARES	Association for learning, social promotion and tourism services

Figure 9 – The Campobasso 2028 (post Action Plan implementation) Vision:

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- Entrepreneurship: By 2028, the fruitful cooperation with stakeholders and the implementation of the strategy defined with the Metacity project have allowed the city of Campobasso to transform itself into an attractive city also for young startuppers. Campobasso can now boast of hosting a research center open to collaboration between universities and private companies to facilitate the creation of new technological firms.
- Smart city and technological infrastructure: A truly interconnected ecosystem has been created where not only intelligent objects communicate with human beings, but above all they communicate with each other, opening the door to social and industrial potential largely unexplored before.
- Health, Sportech, Wellness and Wellbeing: Thanks to Metacity, local stakeholders have developed innovations such as Health & Food Platform that combines health and lifestyle data of Molise citizens and data regarding the environment in which they live; wearable devices for health with high innovation content and apps for Wellness Sport & Health with high innovation content.
- Urban Planning: The digital twin of the city of Campobasso is not just a new technology, it is a civic infrastructure to improve the quality of life of citizens and respond to the great challenges of our time, from environmental to economic and social ones.
- Public services: Residents can access municipal services online, reducing bureaucracy and wait times.
- Education: Technology laboratories have been created to introduce young people and students to the metaverse and artificial intelligence
- International collaboration: Campobasso is now open to new international collaborations which allow it to broaden its knowledge and, above all, to take part in new innovative projects.

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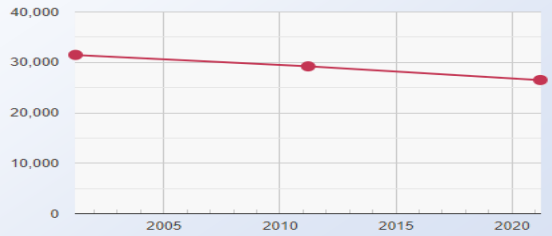
2.3
FUNDÃO (Lead Partner)

Population Size	Density
26 509 inhabitants (2021)	38.1

Population evolution:



City Overview:

Fundão is a city with a developed digital ecosystem, that over the recent years has attracted investments from major digital corporations such as IBM and CapGemini to the city and is a European benchmark in talent attraction and inclusiveness, having rebeen granted the award of "European Capital of Inclusion and Diversity" in 2023 by the European Commission (see: https://eudiversity2023.eu/the-award/the-award-winners-2023/). In these areas the city is a clear benchmark of the network and an inspiration to the other metacity partners.

With an economy largely based just in rural assets only 15 years ago, today the city of Fundão is an important local centre of commerce, services and industry, mainly micro and SMEs. The change started as Fundão decided to invest in technology as a driving force for change. An intensive training programme in programming has enabled young people to redirect their careers, but also their life paths, with many settling in the municipality. The retraining programme, a partnership between the Câmara do Fundão and Academia de Código, consists of three months of intensive programming training for people from any field, which only starts to be paid for once the participants have finished the course and are employed.

Despite its peripheral position in territories of low density, the county of Fundão has had an increasing capacity of fixation and attraction, from the specificities of its territory and its economy, from the interventions in infrastructure and equipment and its functional organization, reinforced by a policy to support the enhancement of creativity and innovation.

Innovation, exploitation of endogenous resources, competitiveness, sustainability and cohesion are essential factors for reflecting and defining forms of intervention appropriate to the specific characteristics of low-density territories.

In terms of Information Technology (IT) and Digital Sectors in particular, Fundão has made significant efforts to establish itself as a technology hub. It is home to the Business and Shared Services Centre and incubators, fostering innovation and entrepreneurship in the IT and digital sectors. This has attracted both startups and established tech companies to the region.

Various startups have established themselves in Fundão's Business and Shared Services Centre and incubators, while large tech companies have also been attracted to open competence centres in the city. Specific names and numbers of employees or turnovers may vary, but these companies contribute to the area's economic vibrancy. (ex. Capgemini; Readiness It, IBM softinsa, itech-on, convevo, etc.).

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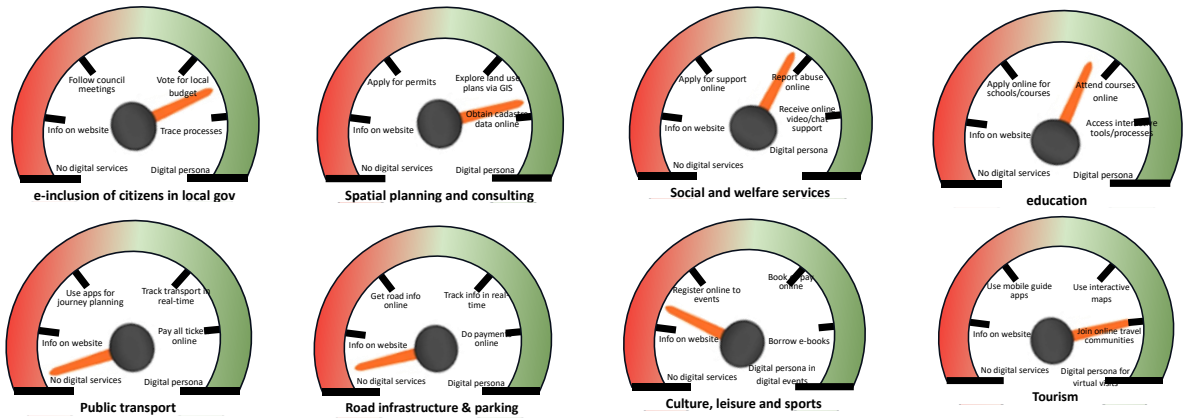
Box 7 – Fundão analysis

Main assets and opportunities:	Main weaknesses and challenges:
01 The demonstrated capacity of the city to attract, retain and serve both major corporations and talent to a rural territory BENCHMARK	The present political cycle, that has driven Fundão towards becoming a vibrant digital ecosystem and a European Diversity Capital, will come to an end in 2025 01
02 The quality and entrepreneurial spirit of the city administration and team	Uncertain political situation 02
03 Openness to new technologies and projects and a strong experience in EU projects management	Located far away from the main Iberian decision and competence centres 03
04 The recognition and visibility that the city has gained in Portugal and also in Europe, which will facilitate attracting more investments.	In spite of all achievements, the city remains a small city of 15K inhabitants (in urban centre), with limited critical mass 04

Current level of digitalisation of public services (based on self-assessment questionnaire)



Fundão metacity assessment

Fundão growth strategy is focused on digital opportunities, with facilities such as to the Fundão Design Factor (where IBM Softinsa is based) officially opened in July 2023, the Living Lab Cova da Beira (that includes a *fablab* for 3D experimentation) and the Business and Shared Services Centre of Fundão, as well as meetings with elected representatives. All these facilities, that will soon be joined by Technology Business Development Centre (under construction) have attracted startups and technology companies to the region, creating jobs in areas such as software development, information technology, and technology-related services, which can play a key role in developing metaverse and AI applications.

The main goal of Fundão is to continue to develop this digital ecosystem, and to serve with top quality and technology-enhanced public services, while continuing to improve the quality of living of its citizens and the efficiency of public services, including in areas as urban planning where the adoption of digital twins is being foreseen.

This digital ecosystem, and the policies and activities that have been implemented to develop it, are a clear benchmark for the metacity network, including the training and qualification activities. Fundão decided to invest in technology as a driving force for change. An intensive training programme in programming has enabled young people to redirect their careers, but also their life paths,

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with many settling in the municipality. The retraining programme, a partnership between the Câmara do Fundão and Academia de Código (now Codeforall: https://codeforall.com/), consists of three months of intensive programming training for people from any field, which only starts to be paid for once the participants have finished the course and are employed.

Another potential benchmark that was addressed during the visit is the technological infrastructure. In 2019, Fundão invested in improving digital infrastructure, including broadband connectivity in all territory. Altice Portugal has taken an important step towards full coverage of the country by covering 100 more parishes with 100% fibre optics. The Municipality of Fundão and its parishes were part of this package. In almost all parishes of the municipality of Fundão, the full coverage of these territories is now guaranteed with this more robust, simpler and more reliable infrastructure in technological terms. Fibre optics allows Fundão to have next-generation communication networks, guaranteeing the most diverse services and opportunities. The next step will be 5G. These improvements were critical to supporting remote work and online learning during the pandemic.

Also, at the same time, the Municipality of Fundão completed the implementation of a LoRA communications network. This network uses a radio frequency technology, enabling the secure transmission of data over long distances (several kilometres) with low power consumption, a fundamental condition for the implementation of Internet of Things (IoT) devices. Composed by twelve antennas, this network will ensure, from now on, the coverage of the entire territory of the municipality of Fundão.

Fundão is a proven and distinguished example at European level in the areas of digital transformation and inclusiveness, and also a city with strong experience in European projects in general and in URBACT in particular.

While the end of the present political cycle in the city may raise some threats (see context above), the city has clear aims in terms of Urban Planning that are well framed with the metacity project, namely in terms of improved digitalisation of public services, digital ecosystem reinforcement and physical infrastructure expansion with 5G networks. All these will be considered within the next planning stage and with support of a ULG that will build on that created and animated for the IoTXchange network with very positive results.

For the remaining metacity partners Fundão can be an inspiration, especially in terms of talent attraction, retention and inclusion policies. A case study on this specific topic will be proposed for the next stage within the Network Roadmap, to be complemented with a city visit during the last CNM of the network in November/December 2025 that will take place at Fundão.

Table 4 – ULG proposed composition

	Name	Organisation
01	Paulo Fernandes	Municipality of Fundão (Mayor)
02	Ricardo Gonçalves	Municipality of Fundão (Head of Innovation and Investment Division)
03	Micaela Gil	Municipality of Fundão (Innovation and Investment Department)
04	Sofia Alberto	Municipality of Fundão (Innovation and Investment Department
05	Filipe Simões	Municipality of Fundão (Head of Service and IT and Administrative Modernization)

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06	José Conceicão	Municipality of Fundão (Architect and head of urban planning division)
07	Vítor Antunes	Municipality of Fundão (Civil Engineer at the Territorial Planning Division)
08	Toni Barreiros	Living Lab Cova da Beira (Architect and responsible for LLCB)
09	João Milheiro	Living Lab Cova da Beira (IT engineer)
10	Lídia Martins	REGIONAL COORDINATION AND DEVELOPMENT COMMISSION – CENTRO
11	Bruno Silva	UBI—UNIVERSITY OF BEIRA INTERIOR (Researcher and Assistant Professor at Department of Informatics)
12	Hugo Torres Vieira	UBI—UNIVERSITY OF BEIRA INTERIOR (Assistant Professor at Department of Informatics)
13	Luis Oliveira	PROFESSIONAL SCHOOL OF FUNDÃO (Director of High-School)
14	Jorge Andrade	GARDUNHA AND SCHIST SCHOOL GROUP (Director of High-School)
15	Pedro Carvalho	ALTICE LABS (Research and development (R&D))
16	Mário Castro	CONVEVO (IT services company)
17	Carlos Silva	FRUITION PARTNERS (IT services company)
18	Nuno Dionisio	SOFTINSA/IBM (IT services company)
19	André Freitas	CAPGEMINI (IT services company)
20	Raquel Pereira	READINESS IT (IT services company)
21	Daniel Pereira	ESPAÇO EMPRESA (Business customer service)
22	Eugénia Guilherme	ACICF – Fundão Commercial and Industrial Association
23	Francisco Chorão	Beira Interior Advanced Training Center

Figure 10 – The Fundão 2028 (post Action Plan implementation) Vision:

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- Infrastructure Development: We've had to invest in high-speed, reliable internet connectivity and ensure that our public spaces are equipped with augmented reality (AR) and virtual reality (VR) capabilities, making it accessible to everyone.
- Education and Innovation Hub: The **metacity** IAP has fostered innovation, leading to the establishment of research centres, technology startups, and cutting-edge industries that drive economic growth and job creation.
- Efficient Public Services: Residents can access municipal services online, reducing bureaucracy and wait times. Advanced data analytics tools help optimize resource allocation and improve service delivery.
- Community Engagement: While it offers convenience, it's also essential to maintain a sense of community. Fundão has developed virtual town halls, digital community events, and immersive civic engagement platforms to foster a sense of togetherness in this digital world.
- Digital Inclusivity: We've made concerted efforts to ensure that all citizens, regardless of age or background, can access and benefit from digital services. The city provides digital literacy programs, affordable internet access, and user-friendly digital platforms for public services.
- Smart Mobility: Public transportation is highly efficient, and the city promotes eco-friendly commuting options such as electric buses, bike and car-sharing programs, and pedestrian-friendly streets.
- Quality Healthcare: Telemedicine and ev-health services have become the norm, ensuring citizens receive quick and efficient medical care in all counties. The new Fundão Healthcare Center provides comprehensive healthcare services, making the municipality a healthy place to live.
- Disaster Readiness: Early warning systems, monitoring of natural disasters, and robust emergency services ensure the safety of residents.
- Community Well-Being: The city offers an array of services at MEMO MOVE, from mental health support to recreational facilities, promoting physical and emotional health among residents.
- Cultural Preservation: Historic districts are beautifully maintained, and the city celebrates its history through museums, cultural events, and historical preservation efforts.
- International Collaboration: Sharing its expertise in sustainable urban development and digital innovation. This collaboration has helped position the city as a global leader in these areas.
- Quality of Life: Its clean environment, well-designed public spaces, and a strong sense of community make it an ideal location for families, young professionals, and ageing people alike.

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2.4
HÄRNÖSAND

Population Size	Density
25 000	13 inhabitants/km²

Population evolution:

City Overview:

Härnösand is a median/small city in the northern coast of Sweden with 25k inhabitants but that is the administrative capital and seat of the Västernorrland County that includes 7 municipalities and hosts about 245.000 people.

The city hosts about 2200 companies, including relevant IT and renewables energies clusters, although the main employer remains the city administration. The city is also a popular destination for outdoors sports and recreation activities and for cruise ships sailing the northern coast, albeit only for short duration (no overnight stays), suffering from a lack of hospitality offer.

The city hosts a campus that offers the possibilities to study at all universities in Sweden with technical courses in energy. The largest local based companies are Food area, vegetables and fish: Agtira, a food producer for retail chains and Absolicon, producer of solar energy solutions for industrial warm water, both with a national presence. The city also has an important cultural landscape, including several relevant associations and NGOs such as the "5' in 12'".

Other relevant sites and local organisations include the municipal library – Sambiblioteket, an outstanding building from the late nineties that also functions as digital centre (DigidelCenter) - the Technichus Science Centre operated by the municipal company under the same name, that operates Virtual Reality facilities that are already being used for Urban Planning. Other projects being developed at the city and region, including the Torsboda Industrial Park, that will host a new battery component factory to be located in the neighbour municipality of Timra and that will create a few thousand new jobs and contribute to develop the energy cluster; the new Herno Gin Hotell, that will address the city current lack of top-level accommodation and contribute to position Härnösand as a conference and experience centre, as well as a new camping site in a recreation area; and the new National archives and tax building, a national structure being built in Härnösand.
All these organisations, together with local larger companies such as Agtira and Absilicon, are also good candidates for joining the future Local Support Group, as they will play a key role in the city's transformation.

The administration of Härnösand is quite advanced in terms of digital transformation. The city, together with the 6 other municipalities in Västernorrland County have launched a e-platform for public services (eSamverkan) and have acquired a first Digital Twin solution which is open to external users. With the support of the municipal company Technichus, that operates a Virtual Reality Lab, the city already uses VR facilities for training of staff in new public facilities and is now aiming to integrate the Virtual Reality into the Digital Twin concept for Urban Planning. The existent facilities and tools are already a good practice for the metacity network.

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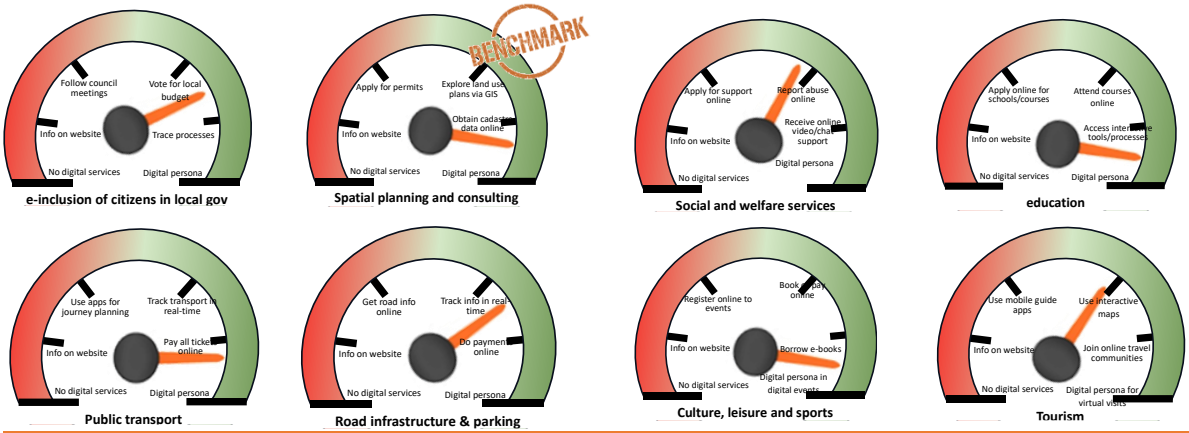
Box 8 – Härnösand analysis

Main assets and opportunities:	Main weaknesses and challenges:
01 Strategic location, good connections by road and train, and proximity to Sundsvall-Timrå airport, as the seat of regional county, with 245K people within easy reach	Lack of local critical mass in terms of population and of a local university, can lead to talent scarcity added to an ageing population with possible resistance to change 01
02 Good digital literacy amongst city officers, strong support from municipal IT company	Exposure of Chinese investments to geo-strategic factors 02
03 New investment projects on-going with impacts in the city's competitiveness	Low levels of European collaboration at municipality, especially for research & innovation 03
04 Local IT and energy cluster with relevant national and international players and proximity to Sundsvall university	High cost of living can reduce attractiveness for talented migrants from other countries. 04

Current level of digitalisation of public services (based on self-assessment questionnaire)



Härnösand metacity assessment

The city and administration of Härnösand is already quite advanced in terms of digital transformation and in the use of advanced digital tools for public services, especially for Urban Planning. The existing facilities are a good practice for the network, and a more detailed study of solutions such as the Digital Twin, the Technichus VR Lab and the eSamverkan platform could be of relevance to other network partners, either through bilateral visits or through a Case Study development in the next stage. In this regard, Härnösand will have clearly more to teach than to learn with the other network partners, but the possibility for inspiration in other cities remains fully open.

But the city is aware that to fully untap the potential for digitalisation, internal processes within the administration of the municipalities need to be developed. To meet this, different methodologies will be needed, where the city works from an in-depth perspective, in collaboration at different levels and has more involvement from the end users during the whole process of development of new and upcoming services than before, to ensure that they choose to do the right things and do them properly, accordingly, to meet the real needs.

This use of the URBACT co-creation methods is one of the main purposes of Härnösand priorities in terms of Action Planning, together with the Digital Twin improvement through VR integration and in its enlarged use, not only by city officers, but also for stakeholders/citizens

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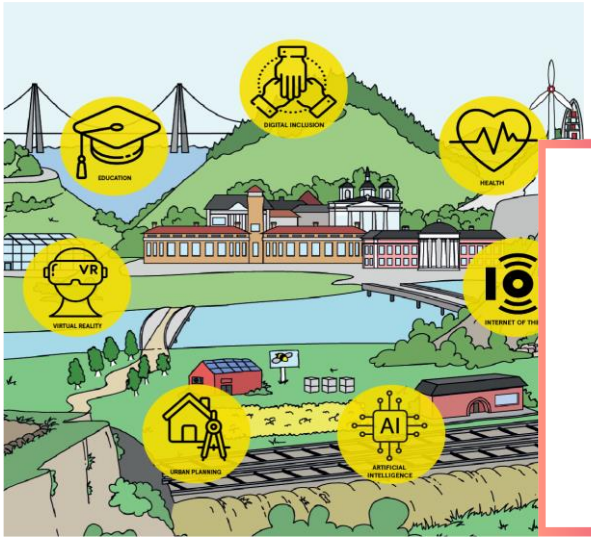
increased engagement and participation. These priorities are well aligned with the metacity objectives, but within the remaining of the Activation Stage it is important that Härnösand closes the focus of its Action Planning activities – either around these topics or with inclusion of some others for which interest has also been expressed, including use of e-services for tourism promotion and education – and develops a robust URBACT Local support Group (ULG) that can help the city officers to create a sound action plan within the next stages of the network.

Table 5 – ULG proposed composition

	Name	Organisation
01	David Gisselman	Technichus
02	Daniel Sundqvist	IT-department, Härnösand Municipality
03	Jens Albonius	Hemab, CIO
04	Hanna Krämmer	Urban planning, Härnösand municipality
05	Marc Holmberg	Social services IT, Härnösand municipality
06	Theodor Andersson	Agency for digital government
07	David Asplund	Digidelcenter library, Härnösand municipality

Figure 11 – The Härnösand 2028 (post Action Plan implementation) Vision:



2028

Our municipality is at the forefront of digital transformation and innovation, actively working to enhance the quality of life for our residents and support sustainable growth and development.

By harnessing the latest technology and fostering an open and inclusive culture, we serve as a model for municipal service and collaboration.

- Digital wellbeing: To empower our 30,000 citizens with the tools to influence decisions that impact their daily lives. Closeness and digitalization make daily life easier.
- Citizens' engagement: Public services have started to become immersive, and anyone can access them through the metaverse – either from home or from the Digidelcenter at the Public Library, and visualize, share and propose new projects for the city.

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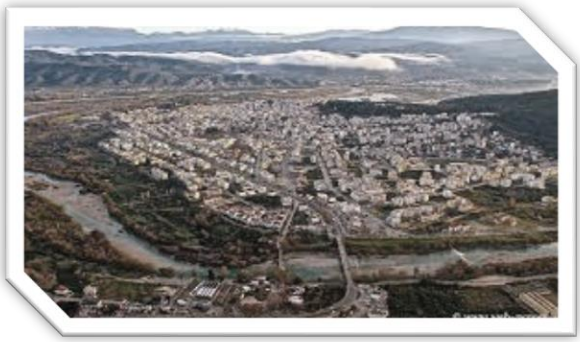
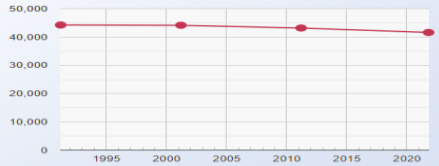
2.5
ISI PATRAS, working w/ the city of ARTA



Population Size	Density
41.600	

Population evolution:



City Overview

The project partner ISI Patras (ISI) will be working within the metacity project, and for the development of an Integrated Action Plan on Urban Development, with the city of Arta.

Built on the edge of the *Peranthi* hill and the banks of the *Arahthos* river (which provided irrigation for ancient *Amvrakia*), Arta is undeniably known for its famous bridge. It has been capital many times, while as ancient *Amvrakia* it was capital of the kingdom belonging to Pyrrhus, the king of the Molossians. In 1204, it became the capital of the Principality or Despotate of Epirus, where it flourished. Today, Arta is the capital, transport hub, as well as the prefecture's commercial and administrative centre. The city is studded with archaeological sites and is a prosperous agricultural city surrounded by groves of orange, lemon, and citron trees. It also produces woolens, cottons, and embroidery.

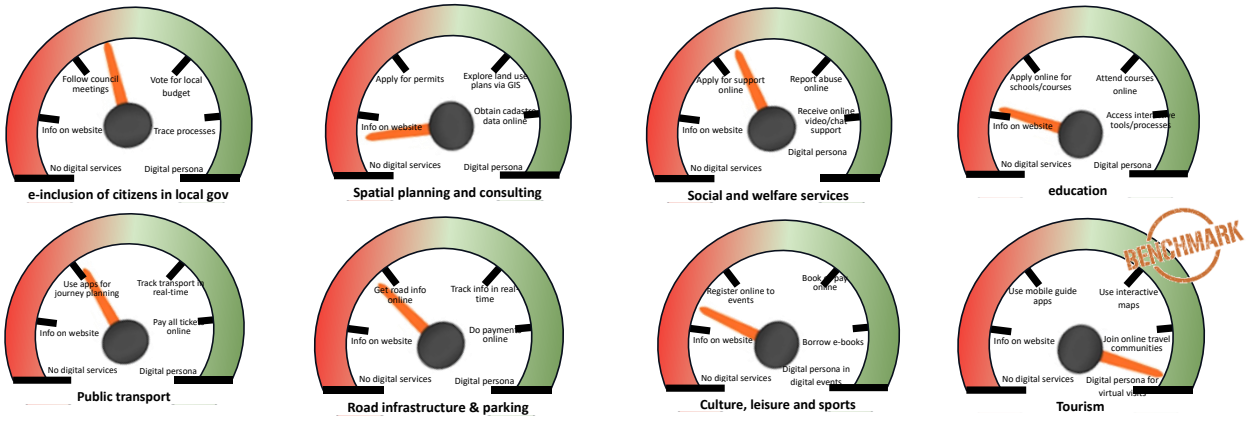
The city hosts several university departments belonging to the university of Ioannina. The main economic activities of the area take place in the agricultural sector, in the sector of energy and environment, and in the tourism (especially eco, cultural and religious tourism) and cultural heritage sector. In particular, the main activity of the primary sector is livestock farming (especially sheep and goat farming and poultry farming) yet, aquaculture is of particular interest. Epirus is the only area in Greece that combines a variety of aquatic media, many species of farmed fish, and various ways and methods of rearing.

The municipal administration in Arta has quite familiarity with the term 'Metaverse' and related technologies like Virtual Reality (VR) and Augmented Reality (AR). There is minimal experience or knowledge regarding the use of these technologies in their current activities. But in any case, they are open to education and exploring new possibilities in this field.

The metacity project and future action plan may prioritize the improvement of digital infrastructure to support the integration of innovative technologies, including the potential use of the Metaverse, VR, or AR, and could focus on specific sectors relevant to the municipal priorities, such as tourism, and promotion of the cultural heritage, and explore how Metaverse, VR, or AR technologies could enhance operations in these areas.

Main assets and opportunities:	Main weaknesses and challenges:
01 The new elected municipal executive – which will come into force in January 2024 – is supportive to the project and to digital transformation	The workforce is not adequately trained in digital technologies, leading to a shortage of skilled labour and digital infrastructure is lacking, making it difficult to implement digital initiatives 01
02 The city and region have an experience of capturing EU fundings for regional development	The local budget is limited, making it challenging to invest in significant digital transformation 02
03 On-going digital projects in the area of tourism, offer solid basis for more advanced developments	Lack of Digital Strategy: Arta lacks a well-defined digital strategy to guide transformation process 03
04 The presence of University of Ioannina, and the collaboration with ISI Patras, can provide a foundation for tech and digital skills development.	Cultural and generational resistance to adopting new technologies could be a challenge, especially with an ageing population 04

Current level of digitalisation of public services (based on self-assessment questionnaire)



Arta metacity assessment

Arta is a city with good potential for digital transformation, with a rich heritage that can be untapped at a wider scale through enhanced digital applications, and with good potential access to EU regional funds. On-going projects such as Mixed Reality Tools for Tourism in the City of Arta offer a sound basis for a more integrated development for visualization of the touristic centre or Arta, for both tourism and urban planning applications, and can be expanded e.g. within a testing/small scale action in the next phase of the network. Other initiatives such as the digital transformation project on the digitalisation of SKOUFAS Association's Library and on the entrepreneurship ecosystem and activities in the city of Arta also show committed players in the digital area that can be engaged in the project.

But it also has serious weaknesses, including the absence of a Digital Strategy or Masterplan that can frame new developments. At a time when the city of Arta is at a political turn point, with a new municipal executive due to enter this next January and benefiting from the cooperation with ISI Patras within the network, metacity can be a golden opportunity for the city to co-create this digital strategy, untapping the potential of the metaverse and AI in benefit of the city.

Within the discussions held during the online visit, this appears to be the most relevant course for the participation of Arta in the network and for the focus of the IAP, which can become a strategic and implementation document, develop with support from ISI and other local stakeholders involved in the future ULG and that at the end of the project will be

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formally approved by the city.

But metacity can also contribute – including through funding of testing/small-scale actions and citizen engagement through the ULG – to other activities such as activities for promotion of tourism through VR/AR.

In both cases, the formalisation of the collaboration between the network partner (ISI) and the new city elected executive, that will enter in January is of the foremost importance, as is the final decisions on the main focus for the project and the subsequent definition and start of activities of the ULG.

Table 6 – ULG proposed composition

	Name	Organisation
01	Mariza Manega	Chamber of Commerce
02	Christina Manifava	Chamber of Commerce
03	Ioannis Golomazos	Chamber of Commerce
04	Nikolaos Bantaloukas	Association SKOUFAS
05	Spyridoula Chouliara	Association SKOUFAS
06	Ioannis Tsoulos	University of Ioannina
07	Jeries Besharat	University of Ioannina

Figure 12 – The Arta 2028 (post Action Plan implementation) Vision:

- Infrastructure Development: Due to metacity IAP, Arta had to ensure that their public services facilities had access to Virtual Reality Equipment, and the AR Devices/Applications could connect with minimal delay to Metaverse. Because of this Arta Heavily invested at 6G, making it the first City in Greece with 6G infrastructures.
- IoT Town: New pathways for Agriculture opened due to Metaverse, where local companies could monitor their field from the LoRa sensors and the Twin Digital in the Metaverse.

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2.6
MOSTAR

Population Size	Density
113.179	

Population evolution:

City Overview

Mostar is a city with a very good potential for development, especially within the framework of an increased collaboration with EU. With a total population of 105,797 (2013), of which 60,195 in the city itself, the city's economy relies heavily on the aluminium and metal industry, banking services and the telecommunication sector.

The city is home of some of the country's largest corporations, including Aluminij Industries, a large industrial agglomerate. Mostar has also several various educational institutions that include University of Mostar, University Džemal Bijedić of Mostar and United World College in Mostar.

The city is also growing popular amongst digital nomads, with an increased and highly qualified foreign population, but there remain strong challenges in terms of the complex political situation, that reflects in the level of urban services and development.

After the war, in 1995, Mostar administration was divided into 3 for the 3 ethnic groups. It was unified only in 2008, with one Mayor elected for a 4-year term, but no subsequent elections were done until 2020. As such local council was blocked for 8 years (2012-2020), with no decision-making – only daily management. Now, a new local government has been elected, but the situation remains unstable. There no longer formal ethic divisions, but cultural barriers to collaboration remain. As mentioned during our visit "the city has no walls, but people still have cultural walls" and there is a lack of an open engagement and collaboration culture across the city, which is reflect in the neglect or vandalism of some of its former landmarks such as the "Partisan monument", which remains have been visited during our stay.

There are several challenges in terms of urban planning and development, and while it is acknowledged that advanced digital tools can be an asset for addressing these challenges, they are also not a top priority for present donors and support programmes, which are more focused on reconstruction and development.

For the implementation of the metacity project, the city administration will be supported by a private organisation, Garaža Makerspace, which can act as main animator and facilitator of the project, at both European and local level. But for a full implementation of the URBACT co-creation model, it will be important to mobilize for the ULG a broader number of engaged participants, from both the public and private-sector, that can contribute with ideas for the future IAP.

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Box 10 – Mostar analysis

Main assets and opportunities:	Main weaknesses and challenges:
01 The city has a background of use of digital tools for urban planning and clear ideas on how to evolve through the use of Digital Twins and other advanced IT tools.	The political situation in Bosnia remains complex, which oftens results in paralysation of the local bodies and decisions and may affect political representation of the final IAP. 01
02 The city can reply on support from a team with good experience of IT projects in Garaža	The division of the city into ethnic communities, even if informal, prevents the emergence of a cohesive and strong digital ecosystem 02
03 The overall level of qualification of the population is very good, including good digital awareness	With several fronts to tackle digital transformation is not a top priority for current donors and programmes 03
04 The city administration and the local ecosystem can rely on well qualified professionals, with a very good orientation towards international collaboration.	While several funding streams are available the fact that Bosnia does not have full access to all EU programmes, limits funding options for the future implementation of the IAP. 04

Current level of digitalisation of public services (based on self-assessment questionnaire)*

** Unfortunately, it has not been possible to collect Mostar self-assessment in due time for the Baseline Study*

Mostar metacity assessment

Mostar shows an excellent potential for the development of an advanced digital ecosystem. The city administration and talent basis is formed of very well qualified and capacitated workforce, and the city is open and willing to embrace international collaboration. There is no shortage of reconstruction and development projects (and funds) that offer an opportunity for the use of advanced IT tools. The Urban planning department already has a solid background in terms of digital visualization tools and is addressing several urban development projects (such as the new planned parking spaces) that could strongly benefit from a Digital Twin approach that could both help urban planners to visualize in full the planned solutions, and further engage citizens and stakeholders in the process. Considering the existent capacity at this department and the relevance of the current projects, this is possibly the most relevant route for the development of the metacity network in Mostar. But the city political and cultural context remains complex, which can create barriers to the adoption of political strategies, attractiveness of former talent and implementation of specific digital projects.

Within the specific context of metacity, the most relevant recommendations for the city that can be extracted from the visit are:

1 – to ensure a continuous and visible political support to the project from the city

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administration, including in all the necessary administrative and management issues.

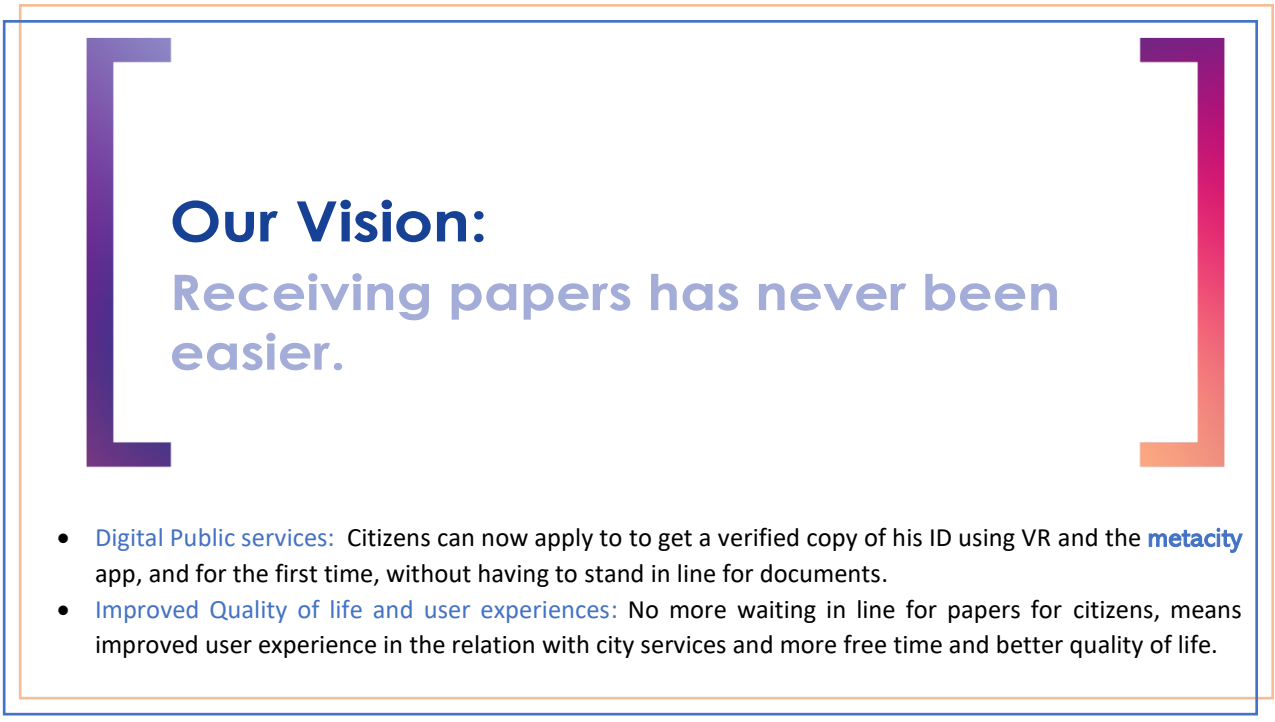
2 – to clearly and promptly define the main focus for the project, in order to be able to engage the right stakeholders within a fragmented and divided ecosystem. From the visit, the course of Digital Twin solutions for supporting specific Urban Planning projects and facilitating public discussion seems the most adequate, but other routes are of course possible.

3 – to ensure a broad and participated ULG, which can be animated by the Garaža Makerspace team but needs to include further stakeholders, from both the public and private sector. A first ULG meeting should take place before the end of the year and reported to the network.

Table 7 – ULG proposed composition

	Name	Organisation
01	Ines Ćorić	Senior adviser to the Mayor for EU collaboration
02	Mirza Šahović	Director at Urban Planning Institute
03	Senada Demirović	Senior adviser for Urban Planning at City of Mostar
04	Nerman Turkic	Project manager Garaža Makerspace
05	Anida Cmanjcanin	Project manager Garaža Makerspace
06	Djani Rahimic	Professor at Civil Engineering Faculty, UNMO

Figure 13 – The Mostar 2028 (post Action Plan implementation) Vision:



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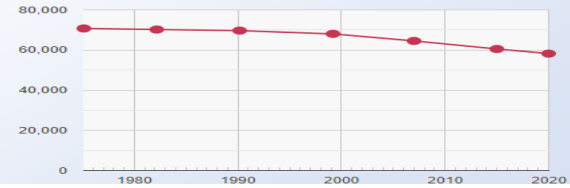
2.7
NEVERS AGGLOMÉRATION

Population Size	Density
64 617 habitants	258,5 habitants/km²

Population evolution:



City Overview

Nevers Agglomération groups the metropolitan area around the City of Nevers, including the Municipality of the City of Nevers together with 12 other municipalities for a total population of around 67.000 inhabitants, of which roughly half lives in Nevers. The President of the Agglomération is the Mayor of Nevers. Nevers Agglomeration maintains a significant investment policy in the big issues of today that stimulates the economic development, with an accent on integration and digitalization of public services such as water distribution, sewage, and waste clearance.

Nevers calls itself «a median city » and is positioning itself as a leader in Digital Transformation for these types of cities, not only in Europe but also exploiting links with overseas cities, especially within the francophone communities.

Within this positioning as a leader for Median Cities Digital Transformation, Nevers started organizing in 2018 the very first International Summit of Innovation in Median Cities (SIIViM), which supports promotion, education and exchanges on digital transformation. Aiming to break with the classic exhibition booths and conferences advertising, the SIIViM is aimed as a forum for meetings and experiences of a new kind that wants to make digital developments intelligible for economic and institutional actors, as well as to the general public.

This event results from the cooperation with the city of Shawinigan (Québec) and is organized between the two cities in alternate years, with the 2023 and 2025 editions taking place in Nevers. The event promotes technological innovation and digital solutions and contributes to the attractiveness of both cities, reinforcing the chance to localize hi-tech firms and qualified talent. It also promotes the image of the cities, as leaders in the segment of 'median' cities, offering a differentiated proposal in comparison with larger cities.

The main interest of Nevers Agglomération in the metaverse and advanced digital solutions, is to move SIIViM into the metaverse, organizing it as a fully virtual event and reinforcing its role as the flagship event for innovation and digital transformation in the region and as a catalyst for the further development of digital services.

In this sense, Nevers is also looking at clusters such as e-games, and aiming to build on the regions experience of large sports events (it hosts the Nevers Magny Cours racing circuit where major event take place, including the French F1 Grand Prix) in order to become a central location for e-sports events.

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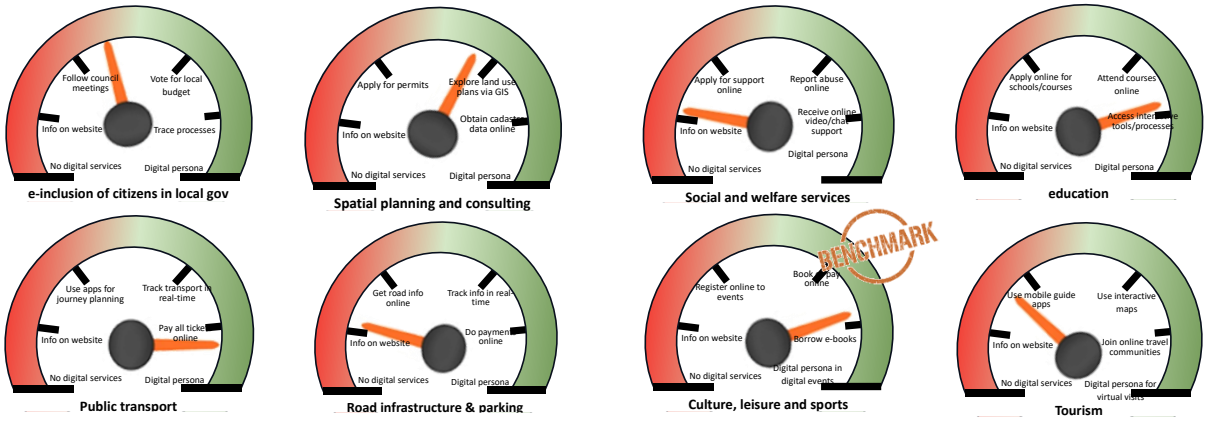
Box 11 – Nevers analysis

Main assets and opportunities:	Main weaknesses and challenges:
01 SIIViM as a consolidated innovation and digital transformation event, with a clear expansion strategy;	SIIViM and digital clusters influence very much limited to francophone communities, with english language limitations from both the part of city/public officers and local stakeholders that condition more global ambitions. 01
02 Well-developed digital ecosystem around the city of Nevers	Limited levels of European collaboration (partly due to language limitations and orientations towards francophone markets. 02
03 Good scale for attracting talent and firms at agglomeration level.	Accessibility issues, with no nearby airport or fast train connection to Paris. 03
04 Growing e-games community, experience in large scale sport events organizations which opens the door for e-sports international events	The digital strategy, both at agglomeration level and within the local municipalities, is too much focused on a project per project approach. 04

Current level of digitalisation of public services (based on self-assessment questionnaire)



Nevers metacity assessment

The main objectives for the participation of Nevers Agglomération in the metacity network are very clearly defined, and can consist of the main pillars of its future IAP:

1 – to evolve SIIVIM towards a virtual event in the metaverse, strengthening its positioning as a flagship event and a catalyst for the region digital economy; the goal is to have a first pilot virtual event in 2025, as a hybrid event between the metaverse and a physical location, before having a full virtual event in 2027.

2 – to boost the regional digital ecosystem, namely within the sector of e-games, placing Nevers as a 'capital' for e-sports events building on its large sport events experience, including the French F1 Grand Prix and on new local initiatives such as the Marzy Virtual Arena.

In order to achieve these two objectives, Nevers Agglomération must consider actions at different levels: technology layer, talent attraction and retention and digital ecosystem promotion, from which network benchmarks can be relevant, as well as to consider external examples on virtual large-scale events.

It can also profit from the metacity network to reinforce the international dimension of SIIViM, attracting its partner cities to the event and placing it as the main dissemination event for the network, in October 2025, where cities can present their future metaverse plans.

All these actions must be developed within the

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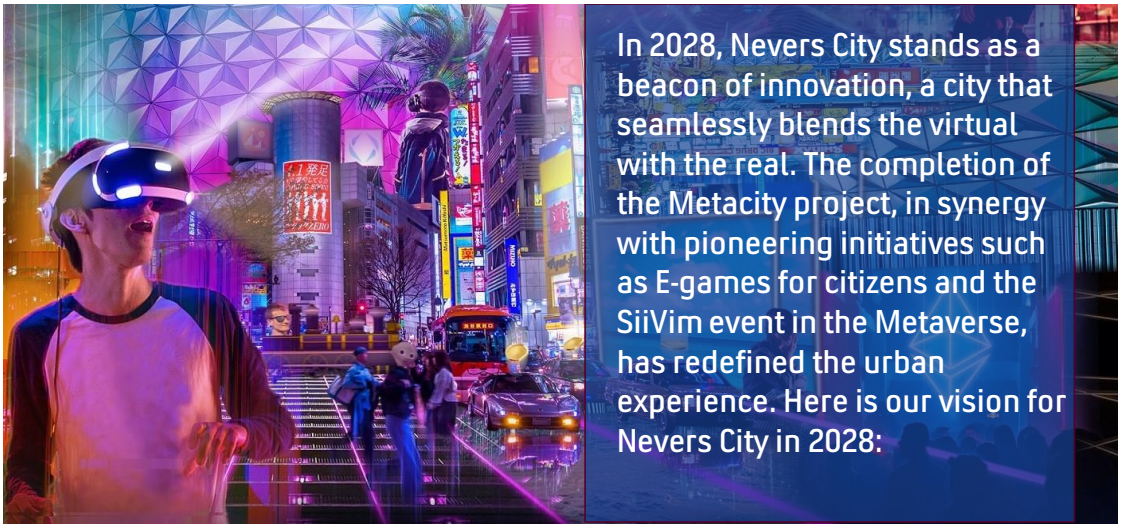
next stage, and support from a carefully chosen Local Support Group. Until the visit, end October, Nevers Agglomération has been mostly busy with the organisation of SIIViM 2023, but it must now speed up the creation of the ULG and the preparation of the next stages of the network, including the reinforcement of the project team.

Table 8 – ULG proposed composition

	Name	Organisation
01	?	Nevers Agglomération Services
02	?	Director of IT Services at Nevers Agglomération
03	??	Local companies
04	??	Nièvre Numerique
05	???	Other members to be identified

Figure 14 – The Nevers 2028 (post Action Plan implementation) Vision:



- Metaverse on Public Space: Due to **metacity** IAP, Arta had to ensure that their public services facilities had access to Virtual Reality Equipment, and the AR Devices/Applications could connect with minimal delay to Metaverse. Because of this Arta Heavily invested at 6G, making it the first City in Greece with 6G infrastructures Citizens access the city's virtual space to attend government meetings, cultural events, and even educational classes.
- SIIViM 100% in metaverse: Since 2025, organizing this event in the metaverse is more cost-effective than renting physical venues, hiring staff, and providing accommodation for attendees. Hosting events in the metaverse were effectively leveraged to create a meaningful experience for participants.
- Virtual arenas: The opening of a virtual arena in Nevers in 2023 is an excellent opportunity to promote and implement best practices for virtual entertainment in the **metacity** partner's and all Europe.
- E-games ecosystem: Using e-games to engage both local citizens and a global audience have created an dynamic and interactive platform that benefits the city of Nevers by promoting its services, culture, and offerings while fostering connections and collaboration on a local and global scale.

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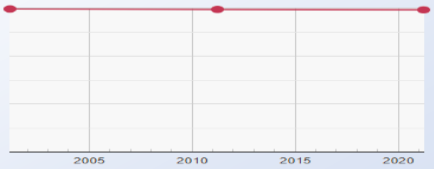
2.8
PÍSEK

Population Size	Density
30 724 (2023)	63 inhabitant/km²

Population evolution:



City Overview

The royal town of Písek is a medium-sized town with approximately 30,000 inhabitants, located in the South Bohemian Region, south of the capital city of Prague, and is the third largest city in this region. In terms of innovation and the overall economic situation in the city, there was a significant impact of foreign direct investment in the industrial zone located in the north of the city. The automotive industry and electrical engineering have the strongest influence. These are most often manufacturing companies such as Schneider Electric, Faurecia Automotive, AISIN Europe Manufacturing, or S.n.o.p cz.

Major innovations are taking place in the area of the old army barracks, where two innovation centres have been built in recent years as a brownfield investment (total investment approx. EUR 40 million). In the last few years, private business has flourished in Písek, mainly in the fields of information and communication technologies and software development.

Písek is also a pioneer in the field of "Smart Cities" in the Czech Republic and is perceived as the most successful Czech city, which has long been involved in the concept of Smart City. In 2015, it was the first company in the country to adopt a comprehensive Smart City strategy, the so-called "Blue-Yellow Book" (named after the city's official colors). This document analyses the current situation, defines the basic pillars and presents the stakeholders who will be involved in the development (so-called stakeholders). It specifically defines individual activities in relation to the specified areas, as well as financial resources that can be used in the implementation of projects. The basic pillars it defines are three: Intelligent Mobility, Intelligent Energy and Services, Integrated Infrastructures and ICT. The Blue-Yellow Book strategy is in line with the "Smart Cities and Communities" activities.

Smart Písek was created as an organizational unit due to the fulfillment of this strategic document and started its activities on 1 January 2017. The city of Písek cooperates with various partners in the development of Smart City, whether they are public institutions (ministries, universities) or private entities.

Important partners involved in the formation of Smart City Písek include, for example, the CTU Faculty of Transport, the Písek Technology Center, E.ON Czech Republic or the Ministry of the Environment.

Písek primarily focused on areas that needed to be changed, either because of cost savings in the future or to increase the quality of life of current and future generations. The main vision is to establish sustainable development in the areas of water management, environmental hygiene, technical and transport infrastructure, socio-demographic and economic conditions.

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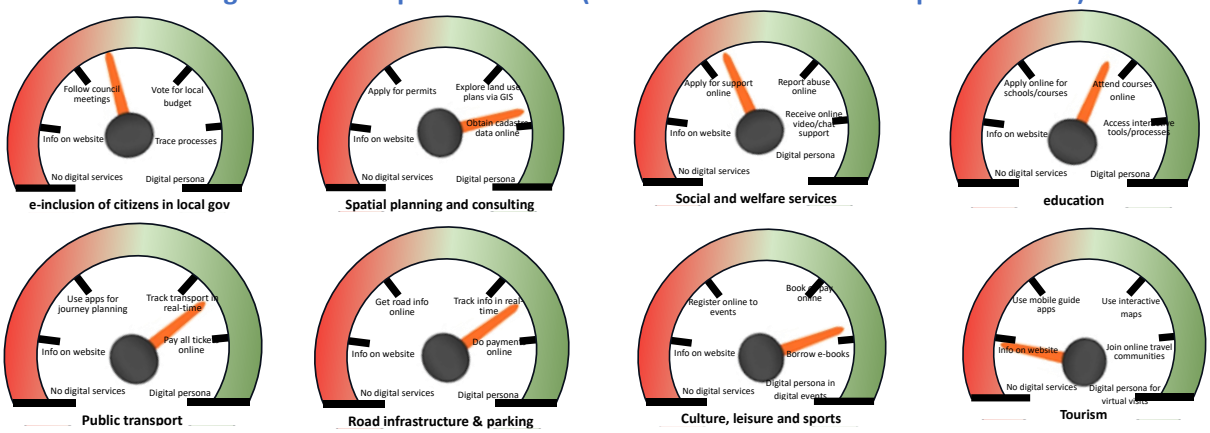
Box 12 – Písek analysis

Main assets and opportunities:	Main weaknesses and challenges:
01 Relevant technological infrastructure in place, with hosting capabilities for new IT projects, and existence of a digital masterplan. BENCHMARK	Local political support to digital transformation policies may be there but could not be validated during visit as there were no possibility to meet elected representatives. 01
02 Operational and planning capacity in the field of digital transformation within the Smart Písek.	Small local digital ecosystem and with some relevant firms being acquired by foreign companies, which may limit their local impact. 02
03 Project team with sound expertise and strong experience of international cooperation projects.	Lack of local university and structural lifelong learning programmes. 03
04 Accessibilities, with proximity to Prague and Plzen and new highways being constructed.	Lack of critical mass in terms of IT talent for further developments, aggravated by the country's restrictive immigration policies and possible 'brain drain' to Prague. 04

Current level of digitalisation of public services (based on self-assessment questionnaire)



Písek metacity assessment

Písek was amongst the first Czech cities to develop a Smart Strategy and creation and development of Smart Písek as an autonomous municipal entity shows the commitment of the city into digital transformation. The city has a sound digital strategy as a starting point and has already identified specific projects (related with the urban development of the city towards the former barracks brownfields) where it can use metaverse and other advanced IT applications. There is a strong digital dimension visible in several dimensions of the city – including education (visible in the visit done to the Sladovna Gallery exhibition and educational centre), and other aspects or urban life, through several projects of Smart Písek, such as the city app (*Můj Písek*), and a parking digital solution using mobile metadata. The city also has a solid IT infrastructure in place as data centres (that can be a benchmark to other cities) and a relevant support and human capacity for the development of the network under the Smart Písek umbrella. As such the city is in an ideal condition to benefit from the networking with other partners and with local stakeholders to consolidate its ideas into a solid Integrated Action Plan, including possibly a testing action in the form of a metaverse simulation of a restricted urban mobility solution related to the development of the new area previously occupied by army barracks.

In order to achieve these goals, the Smart Písek team in charge of the project

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implementation must pay special attention to the following issues:

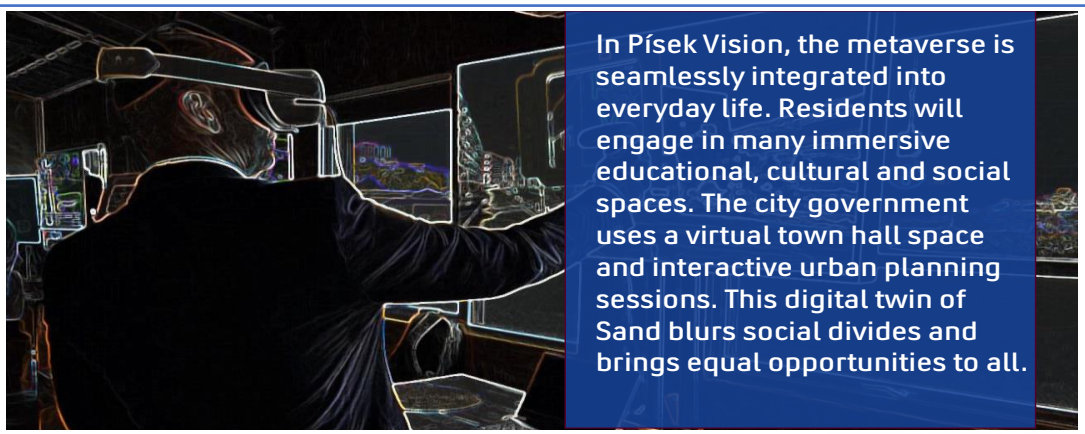
1 – engagement of clear Political Support from elected representatives to ensure the future credibility and relevance of the final IAP.

2 – endure a good and relevant contribution from local stakeholders in the ULG. These must include not only urban planners and technological firms (already present at the first meeting during city visit), but ideally also end-user representatives, e.g. representatives of citizens or of economic sectors in areas close and passible to be affected by the plans for the main target area (the former army barracks brownfield development area).

Table 9 – ULG proposed composition

	Name	Organisation
01	V. Blažek	University of South Bohemia
02	F. Rakovan	Technology Centre Písek
03	M. Prokýšek	Smart Písek, University of South Bohemia
04	J. Chroňák	Active Písek, civic association
05	T. Jakubec	JVTP
06	M. Ješetová	City of Písek City architect
07	P. Trambová	City of Písek Deputy Mayor
08	O. Fučík	Robology
09	J. Roučka / E. Scholtz	Smart Písek

Figure 15 – The Písek 2028 (post Action Plan implementation) Vision:



- Urban planning: Experiencing is more than seeing. Visualizations are a good way to communicate urban development projects. But isn't it better to just walk down the new street?
- VR citizen centre: Sometimes, you need to know, where to enter the virtual world. The Gateway of ePisek can be the right choice.
- Virtual office: There are no boundaries in virtual space. The City of Písek offers equal opportunities to all where physical space causes problems.

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2.9
RAZLOG

Population Size	Density
18 966	35%

Population evolution:

City Overview

Located in southwestern part of Bulgaria, 155 km south of the Capital city of Sofia, the Municipality of Razlog is bordering 2 out of the 3 Bulgarian national Parks – Rila and Pirin, which includes the reserve "Bayuvi dupki Djindjiritsa". The Pirin National Park is listed in the UNESCO World Natural Heritage List. The natural landscapes, divine nature, flora and fauna define the municipality as the main centre and starting point for ecological and mountain tourism, while long-lasting snow cover determines the development of the municipalities of Bansko and Razlog as a center for winter sports.

The local economy is mostly based on trade, tourism (ski, golf, spa & wellness, culture), the processing industry, high-tech industry, renewable energy, agriculture. The processing industry is based on the production of pellets, wood and furniture, construction products and electrical products. The sector is located mainly in the town of Razlog. Agriculture and forestry have significant development potential, especially in terms of organic farming and its links with rural tourism. Despite the completion of active and mass construction in the municipality before 2009, the construction and subsequent sale of real estate continue to play an important role in the local economy. The tourist activity is evenly distributed between the municipal centre Razlog, its suburban territories and the villages in the municipality.

Considering the educated population, the education rate is over 50% which is concentrated in the operation of the six main sectors in the municipality. The unemployment rate is 6,9% of the total population in the Municipality, mostly young people looking for their first job. There is a plan to reduce the percentage of the unemployment by training programmes, to increase their productivity by supporting them to find the right sector where they can apply their knowledge.

In 2022, and as a result from the participation in the URBACT network “IoTXchange”, Razlog developed its first municipal strategy for digital transition (Smart Razlog), which has now moved into implementation with relevant initiatives such as the ‘Smart Management of Public Lighting’, the 3D laser scanning on the territory of Razlog with a drone to increase the availability of quality geospatial data on the territory of the municipality to better plan and implement policies in the fields of resource management, environment, tourism, cultural heritage preservation, etc; and ‘Smart Schools - Purchase and installation of smart boards and interactive digital media to support the education process in schools’. There is also the on-going development of a city app ‘Viber chatbot – the city in my pocket’ and a planned private investment to build a new Data center. In terms of infrastructure, at present, Razlog has over 55% fibre optic and LoRa coverage in all municipal territory with 4G and 5G connectivity.

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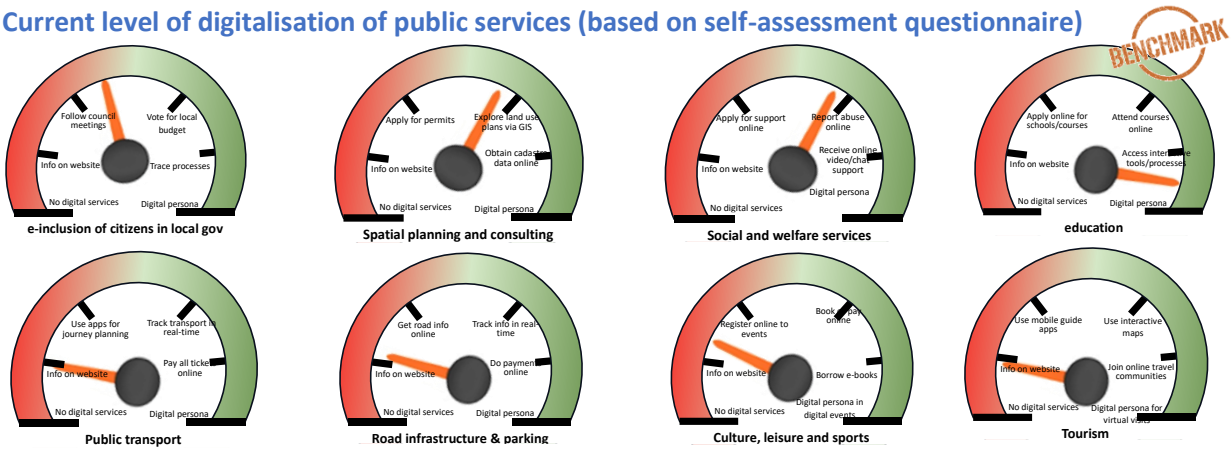
Box 13 – Razlog analysis

Main assets and opportunities:	Main weaknesses and challenges:
01 Following recent local elections, the city regained political stability and a municipal executive that is familiarized and committed towards EU collaboration and URBACT projects in particular.	The limited critical mass of the city, in terms of people, financial resources (both public and private), major stakeholders in the digital area 01
02 Good examples of technology adoption, including in particular in the education sector.	Lack of local public awareness on the benefits of of AI and metaverse 02
03 Digital transition strongly favoured in regional programmes in Bulgaria.	Lack of local university and of established collaboration mechanisms between local actors. 03
04 The city has a strong, motivated and experienced team working in the network, supported by a comprehensive digital strategy developed partly within a previous URBACT network (IoTXchange).	Persistence of low levels of digital solutions in all levels incl. public administration, tourism development and promotion, public security, environmental management, etc. 04

Current level of digitalisation of public services (based on self-assessment questionnaire)



Razlog metacity assessment

Razlog was a very successful example from the potential impact of URBACT networks in smaller cities facing concrete transformation challenges, if they can count on competent project teams and strong political support.

The participation of Razlog in the URBACT III APN "IoTXchange" allowed the city to develop its first digital strategy and to start the implementation of several relevant digital transformation activities, from air quality monitoring to smart public lighting. For the new network, the city of Razlog has betted on stability and can advance further in digital transformation through advanced IT tools, which offers all the guarantees for a sound and relevant planning stage. The online visit allowed to see that the ULG composition is taking shape, and the start of its activities is still expected within this year. The city achievements are particularly remarkable in the field of education – not only in the adoption of new technologies in schools, but also in the promotion of awareness and debate amongst students on the pros and cons of AI, which can only contribute to a more informed and engaged local population.

In Bulgaria, municipalities are in charge of schools up to end of the secondary level, and over the last years Razlog has been developing strong efforts to develop both the level of IT equipment and, more relevant, the level of students' level of awareness on digital issues. The video presented at the online city visit on education is a good example of this, showing examples of the use of 3D tech and also opinions of students on the pros and cons of

AI, on what is a good example of the promotion of awareness amongst students. These examples of use of advanced IT tools on education and of education of IT tools are a benchmark of the network and can be the topic of a masterclass to be organized by the City of Razlog during the next network stages.

Table 10 – ULG proposed composition

	Name	Organisation
01	Krasimir Gerchev	Mayor of Razlog
02	?	Razlog city council
03	Todor Damyanov/ Zlatka Stoycheva	Municipality of Razlog
04	Magdalena Parapunova/ Vanya Ilieva / Katerina Gersheva	Municipality of Razlog
05	Rositsa Tumbeva / Sonya Krancheva	Secondary School "Brothers Kanazirevi" - Razlog
06	Veneta Naneva / Maria Manushkina	Local Action Group, LEADER
07	??	Students
08	Emil Manushkin	Association Destination Razlog
09	Kostadin Tsakov	"User services" Ltd

Figure 16 – The Razlog 2028 (post Action Plan implementation) Vision:

Vison 2030

Time Is Your Most Valuable Resource – Don't Waste It

More time for enjoying the life in Razlog -
Less time for administrative bureaucracy

MetaRazlog gives you a more time for the real important thing in our life - family, friends, sport, hobby, etc.

- Education: Educational institutions in Razlog are experimenting with VR applications and incorporating the metaverse into lessons, creating an immersive environment for personalized learning. One school in Razlog is being transformed into a "metaschool".
- Tourism: 3D museum and interactive virtual reality events recreate a real-world environment and give travellers a clear idea of what to expect. Hotels provide 360º virtual property tours.
- Urban Planning: The digital twin of Razlog, allows officials to test policy ideas on the infrastructure development such as virtual streets before trying them out on the real ones.
- Public services: The city has built its digital platform for public services, including a virtual town hall, public gathering space and digital public services.

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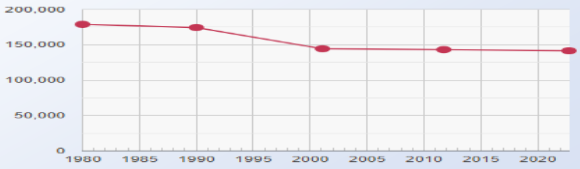
2.10
ÚJBUDA / BUDAPEST XI DISTRICT

Population Size	Density
144 880 person	4533 person/km²

Population evolution:



City Overview

District XI of Budapest (Szentimreváros between 1934-1950, officially Újbuda since 2005) is the most populous district of the capital, and the 7th largest in area. The district of South Buda, which is the English translation of its name, with its varied topography and character, is the western gateway to the capital in terms of transport.

The area, which until then belonged to District I and was mainly agricultural, has seen rapid population growth since the end of the 19th century, leading to the creation of a new district in 1930. The local bodies started operating in 1934. It reached its present size in 1950, when Greater Budapest was created, after the annexation of Albertfalva and Kelenvölgy. Its population grew again significantly from the 1960s to the 1980s as a result of housing estates, and after the opening of the country in the nineties it has grown into a vibrant and cosmopolitan district with intense cultural and artistic life and strong business community.

Traditional manufacturing sectors, which were predominant until the late 80's, have been in decline for three decades, and are increasingly being replaced by knowledge-intensive sectors. The electronics, information technology and telecommunications segments of the local economy are becoming increasingly important, and the number of business services, including financial, educational, health and real estate services, is growing. The district's role in higher education and research and development is also outstanding in a national context and Újbuda is one of the best performing districts in terms of educational attainment at national level. There are around 40,000 businesses in the district. According to the national economic accounts, most new businesses have been registered in recent years in the construction and real estate sectors, in the trade sub-sectors and in professional, scientific and technical fields. The number of businesses per 1,000 permanent residents is high compared even to Budapest average, and the proportion of large companies with more than 500 employees in the district is also higher than the average.

However, the district does not have a digital strategy in place, and its intervention powers are limited in areas such as urban planning, within the intricated municipal legislation in Hungary. Most of the focus so far, including in the large scale UIA funded project, have been directed to the cultural and artistic sector, including with the set-up of the ADAPTÉR centre, initially envisaged as a Arts + Technology Centre, similar to Ars-Electronica in Austria (https://ars.electronica.art/about/en/).

There are no specific digital transformation plans in place at local level as of yet, in spite of the support from a municipal IT company, which is more focused on internal support.

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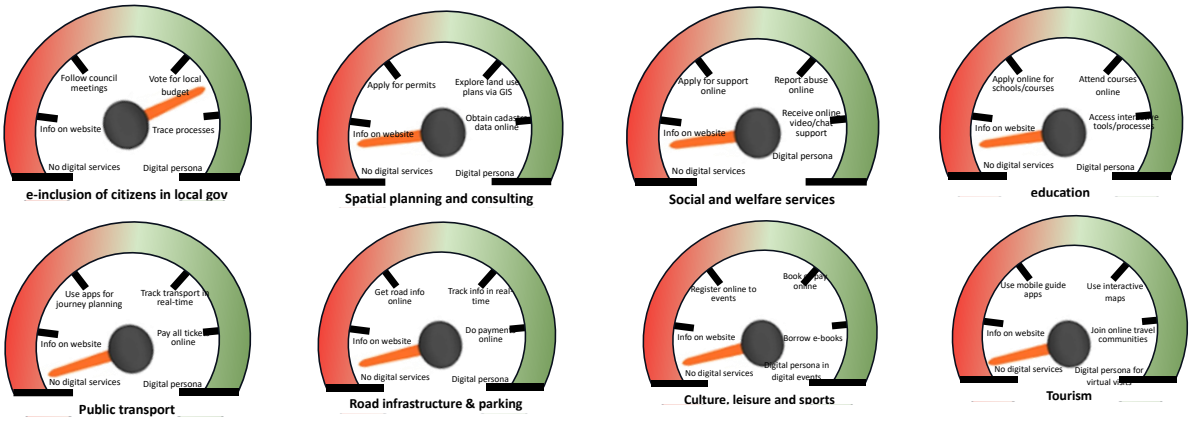
Box 14 – Újbuda analysis

Main assets and opportunities:	Main weaknesses and challenges:
01 There are good potential synergies with other projects (e.g. the UIA project) and the local team has demonstrated a sound capability to attract EU funding that can be essential for the future implementation of the IAP.	The municipality has a limited level of executive intervention in areas such as urban planning, within the Hungarian system. 01
02 The city administration includes relevant support structures, e.g. a municipal IT company (Smart11) and a new digital collaboration centre, UIA-	There is no digital strategy in place, nor a clear orientation towards digital transformation of public services. 02
03 The project benefits from strong political support from vice-mayor and executive team, with a clear orientation towards EU collaboration.	The municipality e-services (website, apps) are still incipient. 03
04 The city has a vibrant cultural and business ecosystem that can attract talent and new endeavours, including in the digital area.	While the district population shows an increasing awareness and capacity towards digital solutions, the municipality's staff is still not sufficiently trained or aware of new digital opportunities. 04

BENCHMARK

Current level of digitalisation of public services (based on self-assessment questionnaire)



Újbuda metacity assessment

Újbuda has all the right dimensions for becoming a thrilling knowledge hub in digital technologies but is missing the strategic framework in order to accelerate the process and align it with the city priorities and those of its citizens and of public welfare. In this sense the present project can be a golden opportunity for Újbuda to seek inspiration in other cities and involve local stakeholders in the planning of a first Digital Strategy and consequent Implementation Plan, that follows state of the art digital developments in areas such as the metaverse and AI. The city has the relevant resources for that, in the form of a committed political executive, a strong project team, a municipal IT company and new knowledge hub stemming from the UIA project, and just needs to put its focus on this strategic and operational planning, using the URBACT methods, tools and available resources for this goal.

Within this sense, it is important to create a ULG adapted to this role of developing the IAP in both the strategic and operational/implementation dimensions, including a suitable IAP coordinator that can master the development of the final strategic and implementation plan, and relevant participants that can contribute to both the strategy and implementation dimensions.

The possibility of a small testing action, piloted by the SMART11 company (e.g. within the area, already under consideration, of test of AI solutions for improved public response in first contacts), should also be seriously considered.

Finally, it is clear that Újbuda has both a lot to learn and a lot to provide to all the metacity network. One key envisaged role of ADAPTÉR will be that of raising awareness of general public and relevant stakeholders on the potential of new digital technologies but also, and at least equally important, to its risks and challenges in terms of legal aspects and ethic values. On this sense, ADAPTÉR will develop, as part of its initial activity programme, a training programme on human values of the future and one on social evolution, plus one on Ecology (Utopics) and a workshop on "*Fake News Factory with deepfake technology*" that can be a relevant network benchmark, as is an aspect that deserves the attention of the entire network, and a similar session was suggested as part of the agenda for the next CNM in Újbuda, in order to make city partners aware of these relevant dimensions of the metaverse.

Table 11 – ULG proposed composition

	Name	Organisation
01	Smart11	Municipality's IT company
02	MOME Innovation hub	Moholy-Nagy University of Art and Design Budapest)
03	BME	Budapest University of Technology and Economics
04	ELTE	Eötvös Loránd University
05	Demola Soart	SME
06	KÉK	NGO; Hungarian Contemporary Architecture Centre

Figure 17 – The Újbuda 2028 (post Action Plan implementation) Vision:

- Local ecosystem: In 2028, Újbuda has duly exploited the synergy between Metacity and the UIA-funded Cup4 Creativity project in order to develop a competitive digital ecosystem in the entrepreneurial, tourism, cultural and creativity areas, with a responsible and ethical use of metaverse and AI tools from all local players
- Digital Strategy: the district has successfully developed its first Digital Strategy, making use of new technologies and with a focus on more inclusive and participated public services.

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03

SYNTHESIS, METHODOLOGY AND NETWORK ROADMAP

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3.0
The metacity network within the broader EU urban context

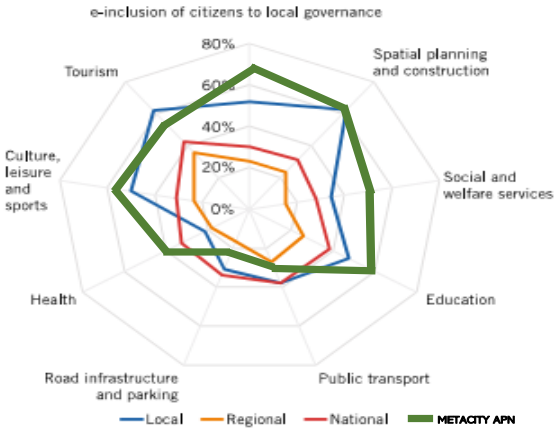
The metacity network has been built has a coherent group – despite the obvious differences – of small and median size cities committed to digital transformation of public services within their cities, as the key to compete with much larger cities within their regions and countries. *But how do the **metacity** partners compare with other EU cities?* There is a perception – based on past projects and initiatives – that metacity partners are better prepared and more aware of the new digital challenges than the average EU city, but does this correspond to reality? *Are the **metacity** partners standing in an advantageous starting point for facing the new digital challenges that the metaverse and artificial intelligence will bring?*

The activation stage of the network offers some answers to these questions, as the city questionnaires used in this stage in preparation of city visits including a section that replicated the ESPON Survey on territorial and urban dimensions of the digital transition of public services, and as such the answers can be compared with the results of this relevant ESPON study. As the conclusions must be regarded with care, as the metacity answers were collected in 2023 and the ESPON data is from 2019 – i.e. before the pandemic and the digital transformation it induced – they offer nevertheless relevant information for planning future developments within the network. This comparison between the metacity network (with the average of the partners' responses) and the ESPON results in the broader EU urban context are presented next.

Results from metacity Questionnaires:

In terms of the *level of digitalised services provided at local level*, the metacity partners compare favourably with the pre-pandemic universe of EU cities, especially in terms of e-inclusion of citizens to local governance, social and welfare services, education, health and culture, leisure and sports – all areas that may have benefited from the boost of digital services during the pandemic.

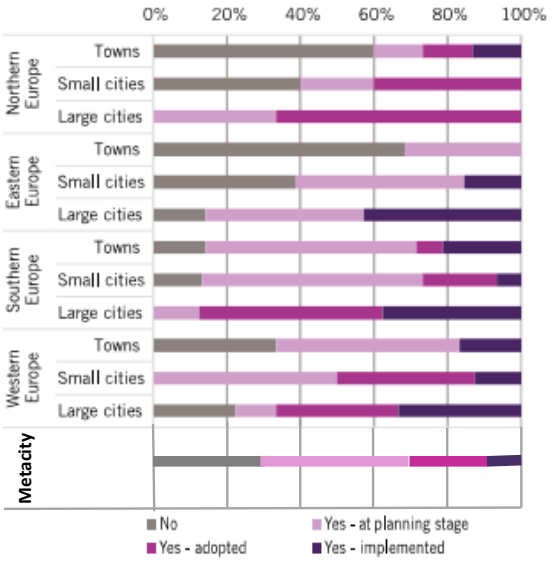
Figure 18
Share of digitalised services provided at local, regional and national levels, by type



On the other hand, they score worse than the EU local average in areas as public transport and road infrastructure and parking which may be a consequence of their small size.

The presence of digital services at local level however does not always imply the existence of a framework digital strategy. In terms of *digital strategy stage*, the metacity partners are indeed very much in line with other small cities in Europe, with a minority of partners with a digital strategy at implementation or adoption level and still a high number of cities without a digital strategy.

Figure 19
Digital strategy stage by city size



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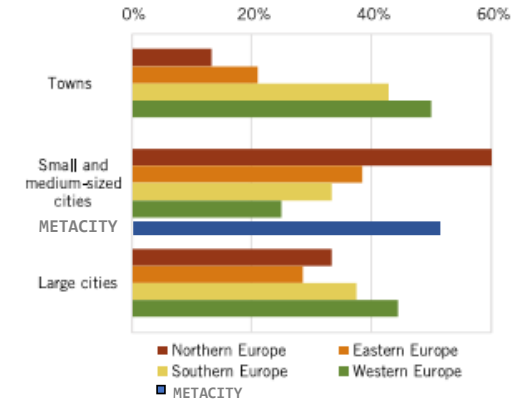
This digital strategy is within the metacity partners often under the *leadership of one single person,* which is in line with the results for small cities in Europe, especially in Northern Europe.

Figure 20

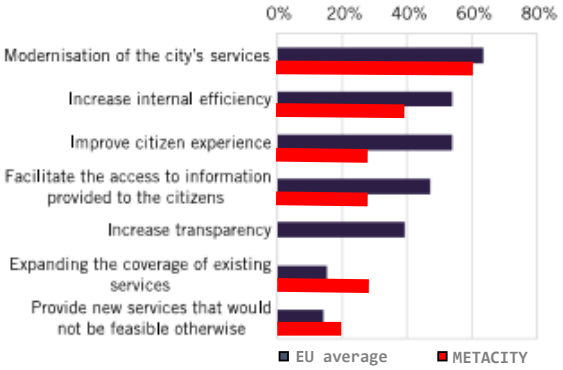
Leadership: share of cities where a single person has the responsibility to oversee/manage the city digital strategy



Also in the what are the *main drivers for digitalisation of public services* the metacity partners are aligned with the average of EU cities. The main driver is '*modernisation of city's services*' followed by '*increase internal efficiency*', '*improve citizens experience*' and '*facilitate access to information provided to the citizens*'. metacity partners however have less concern with the need to '*increase transparency*' then the average of EU cities and are in turn more concerned about '*expanding the coverage of existing services*' and '*provide new services that would not be feasible otherwise*'.

Figure 21

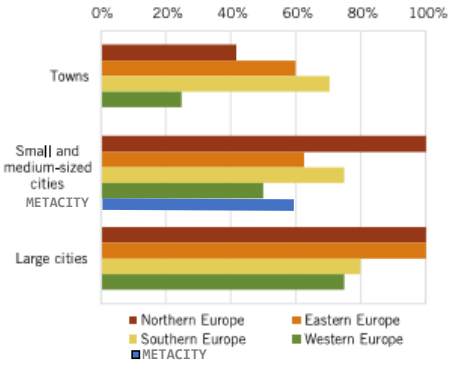
Main drivers of city digital strategies



Like the majority of EU small and medium-sized cities, also most of metacity partners have already a *special budget reserved for the digitalisation of services* in the city budget, albeit less than in Northern Europe.

Figure 22

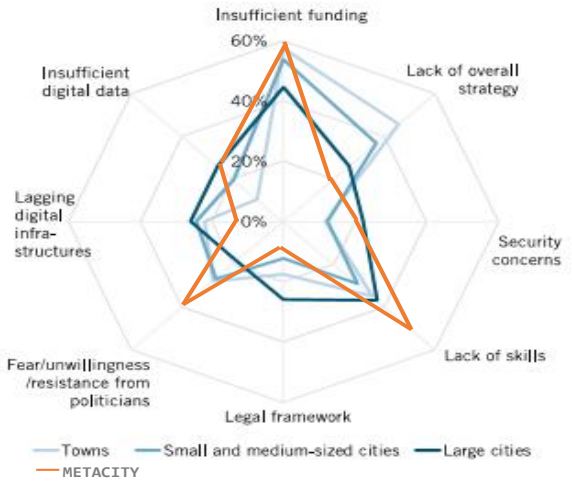
Share of cities with a special budget reserved for the digitalisation of services in the city budget



The analysis of the *factors constraining the digital transition* within the metacity network also do not differ substantially from the average of small and medium cities in Europe as measured in the ESPON study, with insufficient funding being presented as the main constraining factor by far. But lack of skills and resistance from politicians are more relevant factors for metacity partners than for the average of EU's small and medium-sized cities.

Figure 23

Factors constraining the digital transition



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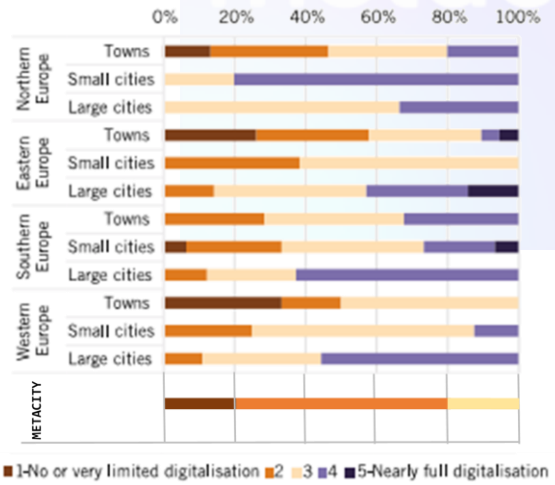
Finally, the self-assessment of the *level of digitalisation of city services* is far stricter in metacity partners than in across EU, with the majority assessing the level as limited and with no partner considering having the work nearly or fully done, which can be revealing of the high expectations placed in the metacity planning process.

This comparative analysis allows to highlight what are the most relevant issues for metacity partners, often aligned with other small and medium city in Europe, in terms of digitalisation: the lack of a digital strategy, the modernisation of public services, in areas such as urban planning, education, or tourism, and having to face with a shortage of skills and insufficient funding.

Figure 24
Assessment of the level of digitalisation of city services



3.1 Synthesis of City Partners analysis

The results above could be further consolidated by the visits to the partner cities performed during the activation stage. While with significative levels of development in terms of digital strategies and services, all the metacity share common challenges – especially in terms of limited resources, largely due to their small size and lack of skills, aggravated by a population decline that is visible in almost all partners – and goals, with the clear intention to benefit from the present wave of digital revolution, with the adoption of metaverse and artificial intelligence tools, to increase the competitiveness of their public services and offer and leapfrog the present gap towards the large metropolitan urban areas that lay within their vicinity and with they wish to compete in the attraction of global investment, firms and talents.

The road of each partner city towards a more immersive digital future is largely dependent on their present status, in terms of digital strategy, technology adoption and ecosystem maturity. While all cities have a long and challenging path ahead of them to be considered as "*metacities*" – the next step of evolution after smart cities – most of them have already relevant achievements in one or more of the axes above – strategy, technology, and ecosystem – and the city visits have also contributed to identify relevant benchmarks within the network that can serve as inspiration beacons to other partners.

Further to this, also external benchmarks can be considered as the example of Tampere, illustrated during the first network Masterclass during Activation Stage (see Section 1) and that be re-visited during the next stages. The synthesis of the main conclusions extracted from the city visits (and from partners exchanges during the 1st Core Network Meeting), in terms of main assets and challenges, relevant benchmarks, degree of maturity in each of the three core development axis, and recommendations for next stages (to be considered in the Network Roadmap) are presented in the table below.

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Table 12 – Synthesis of the City visits and recommendations

Partner	Main assets and challenges in terms of digital transformation	Maturity degree			Benchmarks	Recommendations for Planning Stage
		Digital Strategy	Technology Adoption	Ecosystem Development		
Åbo Akademi, working w/ City of Nykarleby	*Main assets*: the city's ambition, political commitment and networking with knowledge centres (such as Abo Akademi) *Main challenges*: limited critical mass, funding limitations				The online collaboration and citizen engagement methods develop by Åbo Akademi are a great opportunity for application in the city.	a) develop a first comprehensive Digital Strategy, supported by ÅAU and by a strong ULG, that serves as orientation for the implementation of digital actions within the next 5-6 years. b) **metacity** can also contribute – including through funding of testing/small-scale actions and citizen engagement through the ULG – to planned activities such as the participative budget (which can be implemented through digital means) or the development of new plans for the major square, including through the use of testing/small-scale actions to promote awareness (e.g. a demonstration event) or solutions (an open call for ideas, a VR/AR simulation).
Campobasso	*Main assets*: the MolisCTE house of emerging technologies – and the strategy work of the last 5-6 years, that has created a platform for technology transfer and adoption. *Main challenges*: a shrinking population due to young people leaving the area for studies or work and not returning, and relative growth of the ageing population, and (perhaps for that reason) conservative attitudes to digital solutions and new ways of working,				The stakeholders' collaboration model within the MolisCTE project is a good example for other cities, that can lead to technological innovation and ecosystem development.	a) build on the experimental and tech transfer activities of the MolisCTE project and on the capacity of the local university department of Medicine and its digital group, to develop entrepreneurial innovation and foster technology adoption in areas such as education (including on health) and tourism. b) use the sound MolisCTE partnership to develop a digital strategy for the city and region, something that does not yet exist, with focus on areas such as (immersive) Digital Twins for Urban Planning and civic participation, on which Campobasso can learn from the experience of other partners, such as Härnösand and the benchmark of Tampere.

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Fundão	*Main assets*: the integrated ecosystem of actors, actions, financing etc., for attracting business and innovation, and the inclusiveness and qualification model. *Main challenges*: being able to keep the pace through political changes, capturing the necessary level of talent and resources.				The process of creating the integrated ecosystem and making it work in practice, with in particular the inclusion model and re-qualification system which has been distinguished at EU level.	a) Fundão has clear goals in terms of Urban Planning that are well framed with the **metacity** project, namely in terms of improved digitalisation of public services (namely through Digital Twin adoption), digital ecosystem reinforcement and physical infrastructure expansion with 5G networks. All these should be considered within the next planning stage and framed within a new digital strategy. b) the development of a Digital Twin can be particularly relevant for a testing action having in view the large-scale adoption at a later stage.
Härnösand	*Main assets*: very good level of skills, from both city officers and general population, and resources. *Main challenges*: the decision-making processes within the city which are, for now, unable to cope with the quick transformation pace of technology and even society as a whole.				The city tools and instruments in the form of the Digital Twin (the only partner city in Metacity that already has one in operation) and the city VR lab (Technichus Centre), that can lead the city into a new level of digitalisation.	a) to fully untap the potential for digitalisation in Härnösand, new internal processes at municipal administration level will be needed and the use of the URBACT co-creation methods can help in this process, especially with support from a robust Local Support Group (ULG) that can help the city officers to create a sound action plan within the next stages of the network. b) in applicational terms, the priorities in terms of Action Planning are clearly set on Digital Twin improvement through VR integration and in its enlarged use, not only by city officers, but also for stakeholders/citizens increased engagement and participation, while areas of tourism and education can also be relevant topics.
ISI Patras, working w/ City of Arta	*Main assets*: the city already has a good level of digital services in the tourism area. *Main challenges*: lack of talent and resources and of a framework strategy, immune to political changes				The tourism promotion (virtual) tools and services that have been developed by ISI Patras for the city of Arta.	a) **metacity** can be a golden opportunity for the city to co-create this digital strategy, untapping the potential of the metaverse and AI in benefit of the city. b) **metacity** can also contribute – including through funding of testing/small-scale actions and citizen engagement through the ULG – to other activities such as activities for promotion of tourism through VR/AR.

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Mostar	*Main assets*: the city tourism and attractiveness potential, and the possible future access to EU funds if the accession process is successful. *Main challenges*: the ethnic and cultural divisions that remain and fragment the city into separate blocks.					a) to ensure a continuous and visible political support to the project from the city administration, including in all the necessary administrative and management issues and a broad and participated ULG, which can be animated by the Garaža Makerspace team but needs to include further stakeholders, from both the public and private sector. 2 – to clearly and promptly define the main focus for the project, in order to be able to engage the right stakeholders within a fragmented and divided ecosystem. From the visit, the course of Digital Twin solutions for supporting specific Urban Planning projects and facilitating public discussion seems the most adequate, but other routes are possible.
Nevers Agglomération	*Main assets*: SIIViM as a high-visibility innovation and cooperation forum. *Main challenges*: increasing the outreach of both SIIViM and local ecosystem beyond the francophone limits.				SIIViM and the new ambition to make it a virtual event in the metaverse from 2025 onwards.	a) to evolve SIIVIM towards a virtual event in the metaverse, strengthening its positioning as a flagship event and a catalyst for the region digital economy; the goal is to have a first pilot virtual event in 2025, as a hybrid event between the metaverse and a physical location, before having a full virtual event in 2027. b) to boost the regional digital ecosystem, namely within the sector of e-games, placing Nevers as a 'capital' for e-sports events building on its large sport events experience, including the French F1 Grand Prix and on new local initiatives such as the *Marzy Virtual Arena*.
Písek	*Main assets*: The digital strategy, developed already since 2015! *Main challenges*: No strong political commitment visible and no strong digital expertise within the municipality (but available in Smart Písek).				The IT physical infrastructure in place and owned by the city.	a) engagement of clear Political Support from elected representatives to ensure the future credibility and relevance of the final IAP. b) to endure a good and relevant contribution from local stakeholders in the ULG that include not only urban planners and technological firms (present during city visit), but also representatives of citizens or of economic sectors in areas close and passible to be affected by the plans for the main target area.

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Razlog	*Main assets*: Strong and committed local team, with a very good level of intervention already in areas such as education. *Main challenges*: No clear local digital strategy, poor level of resources.				Education sector	a) in Bulgaria, municipalities are in charge of schools up to end of the secondary level, and over the last years Razlog has been developing strong efforts to develop both the level of IT equipment and, more relevant, the level of students' level of awareness on digital issues, and this can be the main application area for the future IAP. b) but Razlog is also in a touristic area and can learn from other cities (e.g. Arta) on how to use IT tools to better promote the city as a touristic destination, both indoors and internationally..
Újbuda	*Main assets*: No strategy but strong political commitment, so everything is possible! *Main challenges*: So far, no clear vision, and an investment based in ad-hoc projects (but some very relevant as the UIA project 'Cup4Creativity')				Citizen engagement and ethics and value awareness results from the UIA project such as Adaptér, and their approach to ethics in the metaverse	a) **metacity** can be a golden opportunity for Újbuda to seek inspiration in other cities and involve local stakeholders in the planning of a first Digital Strategy and consequent Implementation Plan, that follows state of the art digital developments in areas such as the metaverse and AI. b) for that it is important to create a ULG adapted to this role of developing the IAP in both the strategic and operational/implementation dimensions, including a suitable IAP coordinator that can master the development of the final strategic and implementation plan, and relevant participants that can contribute to both the strategy and implementation dimensions.
Tampere (External Benchmark)					Metaverse strategy conception, development and implementation.	

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3.2 Methodological approach and network roadmap

For developing the methodological approach and network roadmap we must build on the main findings from the city visits to the network, presented under 3.1 Synthesis, a section that highlights the main knowledge areas identified during activation stage within the network - and beyond - and that can be shared between partners for inspiring the individual action planning, and build as well as on the main channels for sharing this knowledge both at network and at local level within the URBACT method and at disposal of the network.

The analysis of the city profiles, summarized in the previous subsection, has allowed to identify 10 knowledge/thematic areas within/for the network that can improve the overall know-how of the partners within the topic of digital transformation and inspire the individual action planning process: 5 vertical areas of technology application and 5 horizontal areas of urban relations. Of these areas, 2 have already been shared during Activation Stage an done is external. These knowledge areas are presented in Table 13 below.

Table 13 – Knowledge areas for mutual learning and sharing identified during Activation Stage

Knowledge areas	*Type*	*Knowledge-owner*	*Note*
Online collaboration tools	Urban relations (horizontal)	Åbo Akademi	Shared at 1st Masterclass during Activation Stage
Citizen engagement and ethics & values	Urban relations (horizontal)	Újbuda (within Adaptér)	
Stakeholders' collaboration framework	Urban relations (horizontal)	Campobasso (with MolisCTE)	
Skills inclusion and qualification	Urban relations (horizontal)	Fundão	
Metaverse strategy development and implementation	Urban relations (horizontal)	Tampere	External to the network
Urban Planning (digital twins)	Application (vertical)	Härnösand	
Education	Application (vertical)	Razlog	
Tourism	Application (vertical)	ISI Patras	
IT infrastructure	Application (vertical)	Písek	Shared at 1st CNM in Písek during Activation Stage
Events	Application (vertical)	Nevers (with SIIViM)	

The main purpose of the next two stages – planning and preparing implementation – of the METAVERSE Action Planning Network is to share this knowledge and promote mutual learning between the project partners within these knowledge areas, in order to improve their capacitation and qualification for action planning. Project partners can address several of these areas within their future Integrated Action Plans (IAP), but it is expected that each city addresses at least 1 Vertical and 1 Horizontal topic within their IAP.

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For the knowledge sharing and mutual learning of these knowledge areas, there are within the URBACT programme, and in line with the methodology presented at the project initial application, the following knowledge-sharing instruments at the disposal of the network, presented in table 14.

Table 14 – Knowledge sharing instruments at disposal of metacity for next stages

Instrument	*Level*	*Number*	*Notes*
Core Network Meetings (CNM)	Network level	5	CNMs are the main knowledge-sharing and mutual learning instrument within URBACT. They offer a chance for partners to meet in one partner city, visit good practice/knowledge benchmarks and advance with the common learning process. Within **metacity** and in line with the original proposal, 6 CNMs will be organized, each of 2 days duration, of which 1 during activation stage which has already took place – as such there are **5** CNMs pending for the next stages. CNMs should be ideally organized in cities with relevant knowledge benchmarks so that other partners can profit from the meeting to visit it in-place.
ULG meetings	Local level	Min. 5	ULG meetings will serve to communicate and discuss the knowledge learnt at network level with local stakeholders and advance with the planning process at local level. As such ULG meetings should ideally tale place in-between CNM meetings. An initial ULG meeting should take place within the Activation Stage – after the 1st CNM – or the latest at the start of Planning Stage, and the ULG coordinator and ULG terms of reference should also be developed during Activation Stage or prior to the 1st ULG meeting. As such between **5 and 6** ULG meetings should be organised as a minimum within the next stages – but cities can of course organize more, depending on their individual planning processes.
Masterclasses	Network level	2	Masterclasses are events, that can be held online or onsite, dedicated to a specific knowledge area of relevance for the network, deployed by experts in the area that can both be internal or external to the network. Within **metacity**, it has been decided that Masterclasses will be held online, with a ½ day duration and hosted by the cities that possess knowledge areas to share but that have not been retained for organising one of the 6 planned CNMs. Cities can invite external experts to complement their own presentation of the concerned knowledge areas. As a result of this approach, 3 Masterclasses will be organized in total during **metacity**, of which 1 already took place during Activation Stage, on the topic of Online Collaboration Tools and hosted by Åbo Akademi. As such, there are **2** more Masterclasses to be organised during the next **metacity** stages.
Testing / Small-scale Action	Local level	Up to 10	A Testing Action is the possibility to test in the field a concrete action, at a small-scale, and during a limited period of time, in order to extract conclusions for the larger-scale planning of the action (namely in terms of necessary budget, implementation period and expected impacts) and its integration in the IAP. Each Project Partner can hold a maximum of 1 Testing Action – so up to **10** for the whole network – with a limited budget of up to 10.000€ and for an implementation period of 6 months - and within a priority knowledge area for the city. The focus and content of each Testing Action – and the decision to hold it or not – is therefore dependent on the co-design process of the IAP that cities will conduct with ULGs.

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Study Visit	Network level	1	There is the possibility within URBACT to organize a study visit to a benchmark external to the network. Within the 1st Masterclass of **metacity**, hosted by Åbo Akademi, the partners have been introduced to the example of Tampere and their Metaverse 2040 strategy, and this has been considered as a relevant benchmark for the network. The plan is now to organize **1** study visit to Tampere within the planning stage.
Bilateral visits	Local and Network level	Up to 10	Bilateral visits between 2 city partners, with a delegation of one partner (that may/should include ULG members) visiting a good practice from another partner are encouraged as part of the **metacity** next stages. These visits can be organized at any time at the discretion of the partners involved within the pre-defined periods (in-between CNMs), with the reporting being made afterwards to the Lead Partner and Lead Expert with the maximum of 1 outward visit per city partner, so a maximum of **10** bilateral visits for the network.
Cities demos	Local and Network level	Up to 10	The cities' most tangible results as part of their planning processes – including, but not limited to, any outputs from Testing Actions – can be converted into demonstrations to wider stakeholders' communities at the later stages of the project. These cities demos can take the form of products, videos, software or other materials. Up to **10** demonstrators – one for each partner city – should be developed at the end of the Preparing for Implementation Phase. These cities demos can be made both at local level for local stakeholder communities – e.g. as part of the Local Dissemination Events – and also at network/European level towards other cities and wider policymakers and practitioner communities, including in major events – such as the SIIViM 2025 event in the partner city Nevers or in the EU 2025 Region Week in Brussels.
Case Studies	Network level	2	Case studies are an opportunity to deepen a knowledge area/good practice, allowing the city partners to expand their knowledge about it, ideally before visiting the good practice on-site so that they can make the best use of the visit. As such, a Case Study should involve a preparatory work with meetings with the knowledge area owner and information search, so that a detailed brief – normally in the form of a 1o/15 pages report – can be shared with project partners. The amount of work involved, and the dedication needed, implies the engagement of an Ad-Hoc Expert for the development of those Case-Studies where local expertise is not available. In **metacity**, and considering the number of Ad-Hoc Expert days available, **2** Case Studies are planned for the next stages.
Public consultations	Local level	Up to 10	Public consultations – to larger or restricted groups – can be organised within Partner Cities Partners in order to decide on relevant process stages, such as the topic of the Testing Action to be implemented at local level. They can take the form of surveys to larger population groups using digital methods or voting within restricted groups such as the ULG. The use of Public Consultations within **metacity** is not compulsory but its use at the discretion of each City Partner – up to **10** for the whole network - is recommended at least for the selection of the Testing Action.
Peer Reviews	Network level	1	A Peer Review is a very useful instrument of mutual learning, where a City Partner output is reviewed by other partner(s) with the production of recommendations for improvement. It is a particularly useful instrument for the validation of the first drafts of the Integrated Action Plans. **1** Peer Review of Draft IAPs will be organised within

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			metacity at start of the 'Preparing for Implementation' stage, as part of the 4th CNM.
Local Dissemination Events	Local Level	Up to 10	Local dissemination events should be organized in each city – up to 10 in total for the whole network – at the final stage of the project implementation for public dissemination of the final IAPs. The model and content of each event is the responsibility of each city partner.

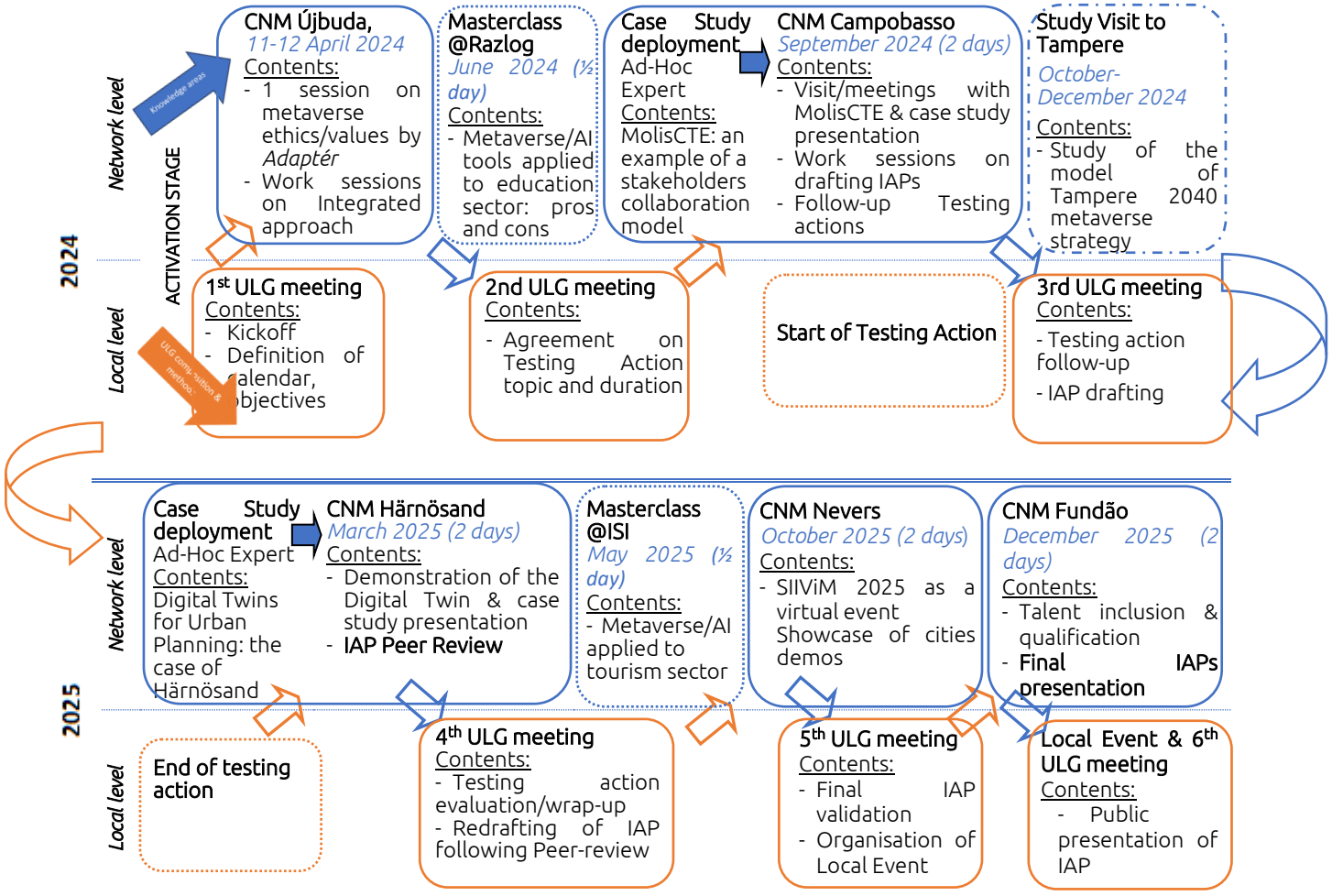
The methodological approach for the next stages of the metacity network results from the application of the available knowledge-sharing instruments presented in Table 14 to the identified knowledge areas presented in Table 13.

The 5 planned Core Network Meetings will serve as the main knowledge sharing and mutual learning instruments and as an occasion to present to the whole network the knowledge areas and good practices identified at local level. To better present the local good practices to the network, and for those good practices with stronger technical content, an Ad-Hoc Expert will be engaged by the network in order to develop case studies that can help explain the process prior to the visit. For more vertical topics (education and tourism), masterclasses will be organized.

Decisions on the place and (approximate) time of each instrument have been made collectively by the network during the 1st CNM held at Písek in end October 2023. The result from this process is presented in Box 15 below.

BOX 15

The main methodological blocks for the next stages of metacity



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The methodology above is well aligned with the URBACT method and placed the focus on the collective knowledge of the network as the main tool for partners individual capacitation.

The sharing and targeted dissemination of the existent knowledge areas and good practices identified in the partner cities during the Activation Stage will allow each partner to improve its know-how and expertise in a broad range of elements that are decisive for the new digital transformation towards the metaverse and to define its individual evolution path through its Integrated Action Plan.

This internal collective knowledge will be complemented as main source with external knowledge and expertise that will be sought from 1 external city benchmark that has been elected as model by the metacity partners following the initial contact during the 1st Masterclass – the city of Tampere, in Finland – and by one or more Ad-Hoc experts that will be engaged in order to develop case studies for two of the more technical good practices, in order to facilitate its full understanding and absorption by the network. The planning for the use of Ad-Hoc experts is presented in Box 16 below.

BOX 16

Ad-Hoc expertise to be requested within metacity next stages

The metacity network will engage a minimum of 2 Ad-Hoc experts within the 'Planning Stage', each for about 10 days of work, with another 10 days of contingency for expertise requests or needs that may arise.

Ad-hoc Expert # 1

Task: Development of a Case-Study on the topic of "Collaboration methods between actors of the Digital Ecosystem" with basis on the Good Practice of the MolisCTE ('House of Emerging Technologies)'

Profile: Expert in Collaboration frameworks

Period: June – September 2024

Workdays: 10 days

Outputs: Case-study and presentation in-person at the Campobasso CNM

Ad-hoc Expert # 2

Task: Development of a Case-Study on the topic of "Use of Digital Twins for Urban Planning" with basis on the Good Practice of Härnösand

Profile: Expert in Digital Twins and/or Digital tools for Urban Planning

Period: January – March2024

Workdays: 10 days

Outputs: Case-study and presentation in-person at the Härnösand CNM

The remaining 10 workdays of contingency available for Ad-Hoc Expertise will be decided before the end of 2024 and may be used for a) support to the development of funding strategies; b) revision and contribution to draft Integrated Action Plan; c) support to the network study visit to Tampere; or d) in other specific tasks presented by Project Partners and that can add-value to the whole network.

The second main element of the methodology lays in the assimilation of the knowledge acquired at network level with the local stakeholders, especially via the URBACT Local Groups (ULGs) set-up in each city. While the methods and tools to be used in each ULG for assimilation and application of this knowledge in will remain largely at each partner discretion, the network - and in particular the lead partner and lead expert – will provide a common framework for the use and reporting of common tools available for ULGs in all partner cities such as the Testing Actions and Bilateral Visits. These common frameworks will be delivered at the start of the 'Planning Stage' and presented to the network during the 1st CNM planned for Újbuda in April, in order to allow a prompt start of the concerned activities, giving the possibility to Project Partners to start both the Local Testing Action and eventual bilateral visits to other cities during 2024, with bilateral visits ideally taking place in the periods in-between Core Network Meetings.

Within the whole implementation period a special attention will be dedicated to the IPA Project Partner Mostar in order to fully immerse it in the URBACT methods and in the on-going mutual learning processes.

The combination of these elements results in the Network Roadmap presented in Figure 25.

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Figure 25
NETWORK ROADMAP

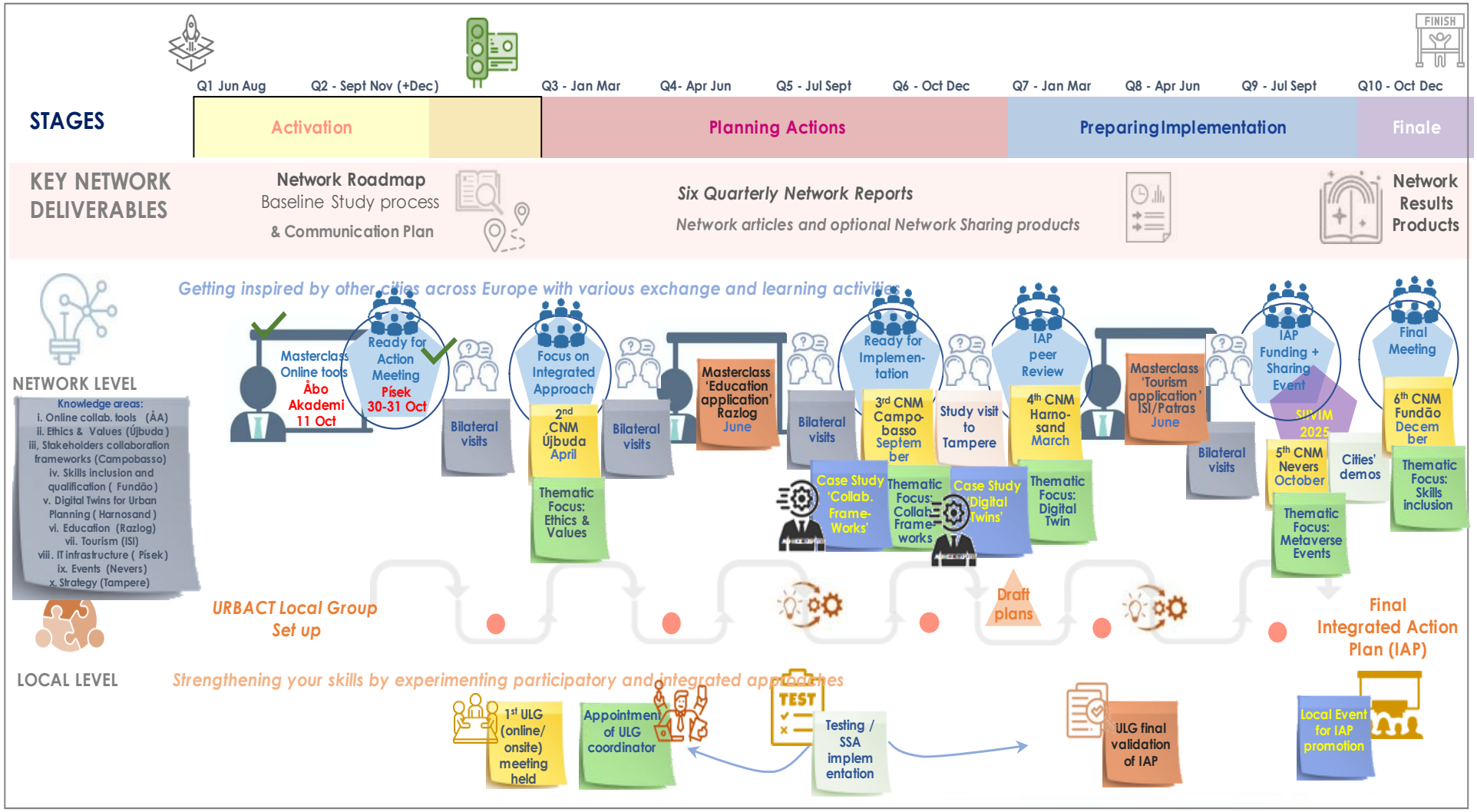

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Table 15 –metacity deliverables and milestones for next stages

When?	What?	Who?	How?	Measure means:
January 2024	1st meeting (kickoff) of ULG completed	All partners	- Meeting held and minuted - ULG coordinator appointed - Terms of reference and calendar for ULG operation agreed	Minutes (suggestion: creative minutes in communication-friendly format) reported to LP and published on mini-site
April 2024	2nd CNM in Újbuda	Újbuda	- Sharing of knowledge area "Ethics & Values" - organization of interactive session on Adaptér	Event report from LE published in Basecamp
		All partners	- Definition of key topics for Integrated Approach to IAP - Definition of bilateral visits programme - Definition of Testing Action	
June 2024	2nd Masterclass @Razlog	Razlog	- Sharing of knowledge area "Education applications" - organisation of masterclass	Event report from LE published in Basecamp
		All partners	- Deadline for start of Testing Action	Report sent to LP/LE
September 2024	3rd CNM in Campobasso	Campobasso	- Development of Case Study on "Collaboration Frameworks" with Ad-Hoc Expert and case study visit organised	Case Study published in Basecamp prior to event
		All partners	- Presentation of 1st ideas for IAP - Reporting on Testing Action Progress - Definition of study visit to Tampere	Event report from LE published in Basecamp
October – December 2024	Study Visit to Tampere	All partners	- Participation in Study Visit	Visit report from LE published in Basecamp
	Interim Report		- Reporting on Outcomes of Testing Action	Report sent to LP/LE
March 2025	4th CNM in Härnösand	Härnösand	- Development of Case Study on "Digital Twins for Urban Planning" with Ad-Hoc Expert and case study visit organised	Case Study published in Basecamp prior to event
		All partners	- Presentation of IAP 1st Draft for Peer Review (minimal content: concept, vision & objectives, initial action list, funding plan)	- Draft IAPs published in Basecamp prior to event - Event report from LE published in Basecamp with Peer Review recommendations
June 2025	3rd Masterclass @ISI	ISI	- Sharing of knowledge area "Tourism applications" – organisation of masterclass	Event report from LE published in Basecamp
July 2025	ULG validation	All partners	- ULG validation of IAP	Report sent to LP/LE

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September 2025	Demos	All partners	- Development of demos of IAP action(s) and/or Testing Action for dissemination (in video, modelling, software, or other format for public exhibition)	Demos published in Basecamp
October 2025	5th CNM in Nevers (during SIIViM 2025)	Nevers	- Sharing of knowledge area "Organization of events in metaverse – experience of SIIViM"	Event report from LE published in Basecamp and SIIViM 2025 available online during all event
		All partners	- Exhibition of demos in SIIViM	
October - December 2025	Local Events	All partners	- Final IAPs approved at local level and disseminated in Local Event	Local Events reported published by each partner in Basecamp and in mini-site
December 2025	6th CNM in Fundão	Fundão	- Sharing of knowledge area "Inclusive and qualified talent force" – study visits to local ecosystem	Event report from LE published in Basecamp
		All partners	- Presentation of final IAPs	Final IAPs published in Basecamp and submitted to URBACT

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04

RELEVANT ADDITIONAL INFORMATION

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4.0
The Author

Eurico Neves, @ecneves, is the CEO and Founder of INOVA+ S.A. a leading firm in innovation studies in Europe. He directly created or participated in the creation of more than 10 new firms, in the services and information technologies field, since 1997. Before he has worked for the European Commission in Luxembourg at DG Enterprise between 1994 and 1997 and has participated in the team developing the European Green Paper on Innovation in 1995. In 2017 he was invited to become a member of the World Economic Forum's 'Digital Leaders of Europe' Community, that he joined in July of that year, having since contributed to the annual report "Innovate Europe - Competing for Global Innovation Leadership" presented in the Davos 2019 WEF forum. He has been cooperating with URBACT since 2005 and is currently the Lead Expert of the metacity APN since July 2023.

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