MĚSTO PÍSEK

SMART PÍSEK

# METACITY PÍSEK

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URBACT

Co-funded by the European Union

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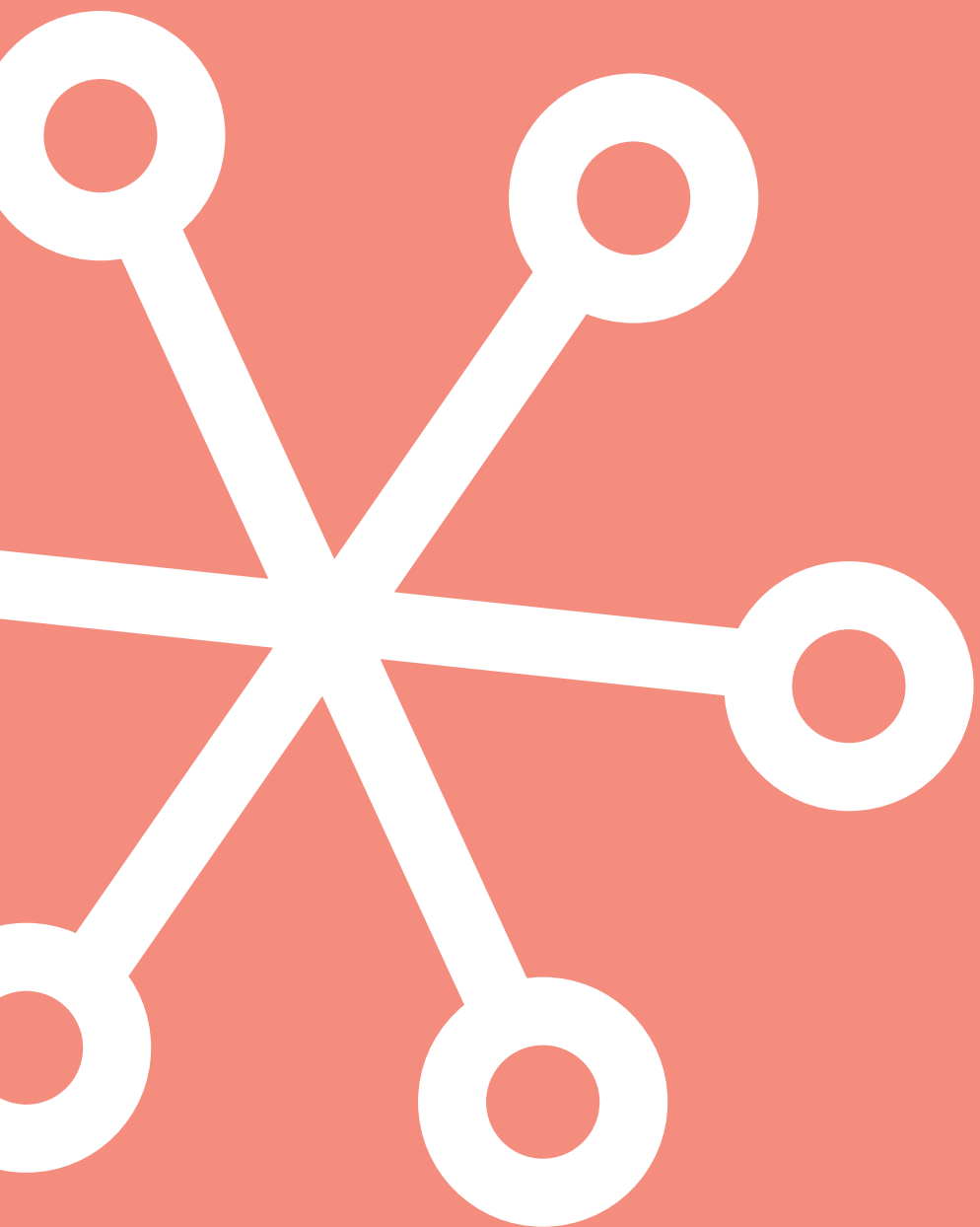


# Contents

# URBACT

URBACT is a European programme aimed at developing sustainable urban solutions through cooperation between cities, responding to the complex challenges facing cities in Europe. Since its inception, the programme has established itself as an important instrument of European territorial cooperation, supported by the European Commission and co-financed by the European Regional Development Fund. Today, URBACT brings together cities from more than 30 European countries, enabling them to share experiences, develop new approaches and apply best practices that will improve the quality of life of their inhabitants and promote sustainable growth.

The programme aims to support cities in developing integrated and sustainable solutions in areas such as social inclusion, digital transformation and the green economy. Under URBACT IV (2021-2027), cities are incentivized to develop local action plans and disseminate good practices among themselves. Each urban authority involved in URBACT has the opportunity to build on the experience of other cities and develop innovative solutions according to their needs and local conditions.

An important part of the programme are the various networks that address specific challenges – such as event planning, the transfer of best practices and innovative solutions. These networks allow cities participating in URBACT to share their experiences and learn from each other, thus creating an effective basis for the strategic development of European cities and thus also supporting the general European cohesion policy.

# METACITY

The METACITY project is an innovative solution aimed at strengthening the competitiveness of smaller and medium-sized cities with the help of advanced metaverse technologies. The main goal is to create an integrated digital environment that will simplify communication, improve access to public services and enable cities to provide new, personalized experiences to residents and visitors.

### Structure and cities involved

METACITY is a network of partners from countries across Europe. The main coordinator is the city of Fundão in Portugal, which is known for its digital innovations. Other cities involved include Campobasso in Italy, Písek in the Czech Republic, Nevers in France, Razlog in Bulgaria, Újbuda in Hungary, Härnösand in Sweden and Mostar in Bosnia and Herzegovina. Research institutions such as Åbo Akademi University in Finland and the Industrial Systems Institute in Greece are also part of the METACITY project.

### Equal opportunities and inclusion

The project emphasizes the inclusivity and equal opportunities that metaverse technologies can offer. Smaller cities, which would not normally be able to afford advanced technologies, gain access to a digital environment that facilitates education, improves communication and contributes to the overall inclusion of citizens.

## The City of Písek and METACITY

The city of Písek is trying to improve communication with citizens and sees virtual and augmented reality as a suitable tool for easy access to complex information and interaction. With the growing amount of spatial data, the possibilities of creating digital twins are opening up not only for buildings, but also for entire city districts, which allows for the visualization of energy, environmental and social data. The virtual environment offers the freedom to create spaces independent of physical reality and provides a platform for communication between different communities in Písek, thus strengthening the cohesion of society without the need for additional investments in infrastructure. These environments also promote equality and resilience in society and reduce disparities between actors.

The main benefit of the project is to gain knowledge about the effective use of virtual reality tools in urban development. These tools allow not only visual but also emotional immersion in the virtual world, which represents a new phenomenon of communication. The city of Písek can use this trend to present information about development projects. The project complements existing Smart Písek initiatives, in particular the Re-Value project, which involves the creation of digital twins suitable for presentation in the metaverse.

# City profile

## Town of Písek

The Royal Town of Písek is a medium-sized city with approximately 30,000 inhabitants, located in the South Bohemian Region, approximately 106km south of the capital city of Prague. Písek was founded in 1243 and is the third largest city in the South Bohemian Region. The historical center of Písek is considered an urban conservation zone.

The economic development of Písek was significantly influenced by foreign investments, especially in the industrial zone in the north of the city. The automotive and electrical industries have the greatest influence here. The main companies include Schneider Electric, Forvia Automotive, AISIN Europe Manufacturing and S.n.o.p cz.

In recent years, there have been significant innovations in the area of old barracks, where two innovation centers have been built as part of the revitalization of brownfields. The total investment in these projects has reached approximately EUR 40 million. In recent years, private business has been thriving in Písek, especially in the areas of information and communication technologies and software development.[1]

[1] *CzechInvest. (2024). Brownfields - revitalization and innovation centers. CzechInvest. https://www.czechinvest.org; Ministry of Regional Development of the Czech Republic. (2024). Support for the revitalization of brownfields from the National Recovery Plan. Ministry of Regional Development of the Czech Republic. https://mmr.cz*

To strengthen the implementation of this strategic document, the Smart Písek organizational unit was created, which began its activities on 1 January 2017. The city of Písek cooperates on the development of a smart city with various partners, whether they are public institutions (ministries, universities) or private entities.

## Demographics

As of December 31, 2023, the population of Písek had a total population of 29,456. In 2023, 825 people moved to the city, while 740 people moved out of Písek.[2] [3]

Písek is the 38th largest city in the Czech Republic in terms of population. Since 2003, when the district offices were abolished, Písek has been operating as a municipality with extended powers, which means that it fulfils a number of administrative functions for the wider area.

[2] *Czech Statistical Office. (2024). Population as of 31 December 2023 - Písek. Czech Statistical Office. https://www.czso.cz*

[3] *Czech Statistical Office. (2024). Population. Czech Statistical Office. https://www.czso.cz*
*Czech Statistical Office. (2024). Population Movement - 2023. Czech Statistical Office. https://www.czso.cz*
*Czech Statistical Office. (2024). Database of demographic data for municipalities of the Czech Republic. Czech Statistical Office. https://www.czso.cz*

*Table 1 Demographics of Písek (2024)*

| | |
|---|---|
| Proportion male/female | 48,3% / 51,7% (14 243 / 15 213) |
| Persons of working age (15 to 64 years) | 66,8% |
| People 65+ | 18% |
| Average age of the population (male/female) | 43,4 (41,7 / 45,1) |

In 2023, 289 children were born in Písek, which means that there are 9.8 new births for every 1,000 inhabitants. In the same year, 359 inhabitants died, which corresponds to a mortality rate of 12.2 per 1,000 inhabitants.

## Unemployment in the city of Písek

In June 2024, the unemployment rate in the Písek district was 2.1%, which is an increase compared to June 2018, when unemployment was 1.3%. This increase is influenced by broader economic factors, the long-term consequences of the pandemic and the migration wave that is a consequence of the war in Ukraine. May 2024 statistics show that there were 652 registered job seekers in Písek with an average age of 42 years and an average registration duration of 475 days. The age groups of 30-34 years and 50-54 years dominate among the unemployed, and in terms of education, people with lower secondary vocational and basic education are most represented. The number of long-term unemployed, i.e. persons registered for more than 12 months, was 103, of which 58 were registered for more than 24 months. These data indicate the need to focus on specific age and education groups in the design of support programmes to improve employment and retraining in the region.[4]


*Image 1 Graph of unemployment in the city of Písek from 2005 to 2024*

[4] *Ministry of Labour and Social Affairs. (2024). Employment, Unemployment and Economic Activity Rates - May 2024. Ministry of Labour and Social Affairs. https://www.mpsv.cz*
*Labour Office of the Czech Republic. (2024). Unemployment as of June 2024. Labour Office of the Czech Republic. https://www.uradprace.cz*

## Economic profile of the city

Písek is a dynamic city with a rich economic base, located in the South Bohemian Region. This city is not only historically significant, but also characterized by a robust business environment that contributes significantly to its economic development.

## Industrial base and key sectors

Písek is an important center of the automotive industry. The city hosts several key companies that specialize in the production of components for the automotive industry. The most important companies include:

- **Forvia Components a Forvia Automotive:** These companies are key suppliers of automotive components.
- **s.n.o.p. cz:** It specializes in the production of metal and plastic parts.
- **Aisin EMC:** A major manufacturer of automotive components.
- **ERT Automotive Bohemia:** Focuses on the production of plastic and electronic components.
- **KUNSTTOFF-FRÖHLICH Czech Plast:** The company produces plastic parts for the automotive industry.
- **Heyco Werk ČR, s.r.o.:** Manufacturer of metal and plastic components for the automotive industry.

These companies not only provide jobs for the inhabitants of Písek, but also make a significant contribution to the economic growth of the region. Their output more than doubled between 2007 and 2013 and the number of employees grew by 36%, which is a testament to their steady growth and importance for the urban economy.

## Diversity of the business environment

In addition to the automotive industry, several other key sectors are represented in Písek that contribute to its economic diversification:

- **Metalworking industry:** Production of metal products for various industrial purposes.
- **Electrical engineering:** Production of electronic devices and components.
- **Construction:** Participates in the construction and maintenance of urban infrastructure.

These sectors not only provide job opportunities but also support the growth of small and medium-sized enterprises, which make up the majority of the business sector in the city. These firms are key players in the local economy, and their success often brings additional business opportunities.

## Business infrastructure and support

Písek offers a high-quality business infrastructure that supports the development and growth of businesses. The key elements are:

- **Industrial Zone and Urban Area**
- **Technology Centre Písek (TCP):** This center specializes in ICT services and cloud computing and works with academic and technology partners to deliver innovative projects. TCP is an important technology center that supports the development of the local economy and strengthens its competitiveness.

## Impact on the regional economy

Private companies in Písek are key players not only within the city, but also in the wider region. Large enterprises employ a significant part of the population and account for more than 30% of total employment in the city. In this way, they contribute to economic growth and ensure the stability of the regional economy.

## Investment and development

The city of Písek actively supports investments in new technologies and infrastructure development, which includes the expansion of industrial zones and support for new business projects. This strategy makes Písek an attractive destination for new investors and businesses, which supports its economic growth and stability in the future.


volume borders
Build options

# ICT strategy papers

## National Strategy Documents

The City of Písek is governed by several strategic documents at the national level, which focus on the issues of IT, ICT and digitization. These documents have a significant impact on urban policy and development in these areas.

1. **Digital Czechia Strategy:** This document covers the overall approach of the Czech Republic to digitization and IT technologies and is key for cities, including Písek. The strategy focuses on developing digital skills, infrastructure and services that are essential for a modern digital economy and society. The aim is to ensure that the Czech Republic is competitive in the digital environment, improve access to digital services and promote the security of cyberspace.
2. **National Artificial Intelligence Strategy (2019–2035):** This strategy focuses on the implementation and development of artificial intelligence in the Czech Republic. It contains plans and measures to support research and application of AI technologies in public administration and other sectors. This strategy is important for the city of Písek because it can affect the introduction of intelligent systems and technologies in the city.
3. **Strategic Framework Czech Republic 2030:** This document presents a long-term strategic plan that also includes the IT and ICT areas. It focuses on improving the quality of public administration, supporting digital transformation and the development of open data, which has a direct impact on the city administration and can help Písek in its efforts to digitize and implement smart solutions.
4. **National Strategy for the Development of the Digital Economy and Society (2023-2027):** This strategy supports the development of the digital economy and the integration of modern technologies into all aspects of society. The aim is to support digital innovation, improve digital literacy and ensure that the Czech Republic remains at the forefront of technological progress. The city of Písek can use this strategy to develop its digital projects and innovations within Smart City.

## Local Strategic Documents

The city of Písek has several strategic documents that have an impact on the issue of ICT, Smart City and other technologies.

1. **Blue and yellow book Smart Písek (2015):** This document presents the basic concept for the development of a smart city in Písek. It contains objectives and measures aimed at improving urban mobility, energy and the integration of ICT technologies into everyday life. It also includes the smart management of urban services and infrastructure, including monitoring and security systems, and promotes digital innovation and the active participation of citizens.

2. **Strategic Development Plan for the City of Písek until 2035:** This plan includes a comprehensive strategy for the city in the medium term and is one of the main documents of the city.[MP1.1] The structure of the newly created plan (the old one is valid until 2025) builds on the structure of the previous strategic plan and is divided into three main axes, namely: Economy, Mobility and Infrastructure, and City Attractiveness.
3. **ICT Strategy of the City of Písek:** This document deals in detail with plans and measures for the development of the ICT infrastructure of the City Hall. It focuses on ensuring cybersecurity and upgrading existing systems. Key elements include improving e-services and digitizing city administration, which makes it easier for citizens to communicate with authorities and increases the efficiency of city processes.

# Vision and goals of ICT in the city of Písek

## City goals

The city of Písek is currently actively developing its ICT infrastructure, which includes modern technologies and information systems supporting effective city management and the provision of services to citizens.[MP2.1]

The main goal is the digitization and digitalization of the services provided, which will allow citizens to access the services of the city hall at any time and from anywhere via the Internet. This reduces the need for personal visits and improves the availability and comfort of services. Key areas include modernizing and maintaining infrastructure including hardware and software, and supporting the development of cloud technologies and virtualization, allowing for more flexible and efficient data and application management.

The city is also expanding its range of electronic services, which includes the introduction of an electronic mailroom, the possibility of online submission of applications and other services that facilitate communication between citizens and authorities. A key element of the vision is to increase efficiency and transparency in public administration, which will be achieved by optimizing work processes using modern ICT tools and ensuring easy access to public information. Cybersecurity is another key aspect, including protecting data and systems from cyber threats and ensuring the integrity and trustworthiness of municipal information systems.

## Vision of the city

The City of Písek is committed to creating a secure ICT environment that protects the personal data of citizens. It also seeks to incorporate Smart City concepts into its operations, which includes the use of technologies such as the Internet of Things (IoT), cloud computing, and open data to create smart solutions in the fields of transportation, energy, and healthcare. Continuous modernization and expansion of ICT infrastructure is planned, which supports all aspects of the digitalization and digitization of city services, including ensuring fast and stable access to the Internet and modernization of hardware and software equipment.

In its main strategic document Strategic Plan of the City of Písek, the City of Písek states through a vision that Písek is an open and trustworthy city, open to innovation and new technologies. The city's vision is therefore to develop communication with all stakeholders, including through new digital tools.

## Project vision

The vision of the METACITY project in Písek is based on the use of the metaverse environment as a new communication tool. The city of Písek suitably combines the traditional approach with the metaverse and benefits from both approaches. The immersive, multi-user, and open environment of the metaverse offers potential in a number of areas such as tourism, education, architecture, and urban planning,

contributing to better understanding, accessibility, and engagement not only for residents but also for visitors to the city. The project forms the basis for the gradual digitization of public and cultural life in Písek.

1. **Digital transformation of tourism and education:** The METACITY project presents Písek as a modern tourist destination by combining cultural heritage with the latest technologies such as virtual and augmented reality. Visitors and citizens alike can visit the city's important historical sites in an interactive format that allows them to experience history live. For example, the visualization of the Stone Bridge, including dramatic events such as the flood of 1768, provides a unique insight into the city's history. **Verification Resource** – Number of Digital Artifacts, Number of Views
2. **Transparent communication:** Thanks to state-of-the-art VR technologies, such as the MetaQuest 3 glasses, the city of Písek can display planned projects and communicate them with the public in an interactive and spatial form. This allows citizens to better understand the future development plans of the city and monitor the planned changes in different parts of Písek. **Validation Resource** - The number of projects presented as an immersive visualization
3. **Basis for future technology development and implementation:** The METACITY project represents the cornerstone for further technological development in the city. The implementation of metaverse technologies in tourism, education, and public life serves as a model for the use of these tools in the city's infrastructure and economy. Future projects, in cooperation with memory institutions such as the Prácheň Museum, will also include the visualization of historical stories, local legends and legends, thus expanding the possibilities of experiential presentation of cultural heritage. **Verification Resource** – Number of Digital Artifacts, Number of Views

## Draft an Integrated Action Plan Action Table

| Events | Responsibility | Deadline | Funding and resources | Monitoring and success indicators | Risk and sustainability |
|---|---|---|---|---|---|
| Completion and publication of the visualization of the Stone Bridge | City of Písek, Digital Media, Prácheň Museum | Q3 2025 | URBACT Grant, VR technology | Number of views (YouTube, VR, mobile devices), public presentation (FB) | Risk of production delays (addressed by Digital Media), content will remain available online for a long time |
| Testing visualization in the information center | City of Písek, Destination Company of Písek | Q4 2025 | - | Number of visitors to the VR exhibition | Possibility of repeating testing in the following years |
| Evaluate feedback and identify expansion opportunities | Smart Písek, ULG | Q2 2026 | Internal human capacities | Suggestions for expanding the project | Risk of low interest in evaluation (solution: connection with city events), results used for other events |
| Extension of visualization to other historical objects | Town of Písek, Prácheň Museum, Smart Písek | Q2-Q4 2026 | Grants, city budget | Number of new visualizations, their views | Risk of not finding suitable funding (solution: active search for grants), the project brings lasting added value to the city |
| Ensure long-term management and update of visualizations | Smart Písek, Municipal IT Department | From Q1 2027 | City budget | Regular annual update of visualizations, use in city events | Risk of obsolescence of technologies (solution: planned modernization every 5 years), sustainable integration into Smart Písek projects |

# Integrated approach and impact of the project on the city of Písek

As part of an integrated approach, the METACITY project brings concrete impacts on various areas of life in the city of Písek. These impacts can be broken down according to their benefits for the economy, social inclusion, environmental protection and other areas.

## Breakdown of impacts at different levels

- **Economic impact** – The implementation of IAP has an indirect impact on the city's economy. From the perspective of the digital transformation of tourism and education, the existence of appropriate content can increase the attractiveness of the city and its history and encourage tourism. The active use of the metaverse will facilitate the process of planning and implementing the city's construction projects. Speeding up the process and identifying the problem during this phase alone will save costs during the implementation of the construction. In retrospect, by integrating digital twins into the metaverse environment, it will enable effective management and development not only of individual buildings, but also of larger units, such as neighborhoods or city districts.

- **Social impact** – The metaverse inherently blurs social and cultural differences, offering a level playing field for almost all users by mediating contact in the form of avatars. This can be very beneficial in the field of education, while also offering a creative and open environment for creation. An interactive, inclusive and shared environment of this type can streamline the teaching process not only in the humanities, such as history, but also in STEM.
  The opportunity to actively participate in the city's development projects through remote presence (telepresence) opens up completely new possibilities for inclusion and involvement of citizens. Overall, it can positively influence the perception of the city as an open and modern partner.

- **Environmental impact:** The combination of digital twin technology, spatial video, collaborative spaces, and other metaverse capabilities helps reduce the need for a physical presence in a given location. This has a positive impact on the environment by reducing the burden caused by traffic. In addition, the metaverse allows you to visualize a series of data and thus make it possible to understand their mutual relationships in a given space.

**2. Benefits for Local Communities and Stakeholders**

- **Citizens of the city of Písek:** The metaverse brings the history of the city closer through digital technologies and strengthens the local identity and pride of the residents. It enables inclusive involvement of citizens in decision-making processes.

- **Local entrepreneurs:** The project presents Písek as a modern tourist destination and brings entrepreneurs opportunities for the development of products and services related to VR, such as thematic tours.
- **Schools and educational institutions:** Interactive content enables schools and educational institutions to use immersive virtual environments as a modern teaching tool. Students have the opportunity for experiential learning that fosters their interest in local history and cultural heritage.

**3. Examples of specific cases and scenarios**

- **Virtual tour from home:** Users can view the bridge in its historical form from home via VR or mobile device. On the city's website, they can run an interactive tour that will bring them closer to the structure of the bridge, its details and historical stories.
- **Exhibition with VR in the Tourist information center:** To support tourism, a permanent VR exhibition can be installed in the city information center or museum. Visitors can „walk" through the bridge in its historical form, which strengthens the tourist offer of the city and contributes to the number of visitors to local cultural facilities.

**4. Taking into account the socio-economic context**

- **Employment:** The METACITY project brings job opportunities not only in tourism, but also in technology. The involvement of local companies and universities in the creation of visualization supports the development of modern technologies in the city.
- **Digital skills:** The project helps citizens develop digital skills. VR installations are also useful for training sessions and workshops, helping boost digital skills within the community and better preparing people for a digital future.

**5. Connection with other projects**

- **Smart Písek and Re-Value:** The visualization of the bridge is linked to the Re-Value project, which includes the creation of digital twins for urban infrastructure planning. This approach facilitates the development of sustainable hiking trails and supports the coordination of urban projects.

# Implemented projects

The city of Písek has implemented several important projects aimed at modernizing ICT infrastructure, which were financed from the Integrated Regional Operational Programme (IROP). Specific examples of already implemented and completed projects:

**More efficient public administration (2016 – 2022):**

- The project included the modernization of the city's data center and the introduction of new information systems (digital official boards), which improved the availability and quality of public services for the residents of Písek.
- As part of the project, a mobile application called My Písek was created, which provides residents and visitors to the city with up-to-date information, a calendar of events, a map of the city and the possibility of communication with the city office. Users can easily monitor traffic, parking and use the city's electronic services. The app is available for free for both Android and iOS devices and improves access to information and services.

**Development of the eCulture concept (2018 – 2021):**

- This project was dedicated to the digital documentation and presentation of the cultural heritage of the city of Písek. Digital archives of cultural monuments were established to enhance information accessibility for both professionals and the general public. Additionally, the project involved the development of an online platform designed to improve access to cultural resources and promote greater awareness of the city's cultural legacy.

# METACITY SWOT Analysis


## Strengths

1. **Leadership in Smart Cities:**
   - Písek has a long tradition in the field of smart cities and already in 2015 it adopted a comprehensive Smart City strategy, known as the „Blue-Yellow Book". This experience will facilitate the integration of modern technologies such as the metaverse.
2. **Existing infrastructure and innovation hubs:**
   - The city has a strong infrastructure for ICT and a technology center focused on modern data centers and cloud services, which can support the development of metaverse applications.

3. **Partnerships with technology and academic institutions:**
    - Cooperation with CTU and other partners creates a strong base for technological development and innovation, which facilitates the implementation of modern technologies and projects such as METACITY.
4. **Strong civic engagement and participation:**
    - The city actively encourages citizen participation, which can be key to the adoption and successful use of metaverse technologies for communication and interaction between the city and its residents.

### Weaknesses

1. **Lack of digital skills:**
    - The conservative attitude of some staff and the public to new technologies may slow down the implementation and adoption of metaverse technologies.
2. **Lack of experts and personnel capacities:**
    - The city faces a shortage of skilled IT professionals, which can complicate the implementation and management of complex metaverse systems.
3. **Lack of coordination and fragmentation of data sources:**
    - The lack of a unified system for sharing and managing data can complicate the integration of modern technologies and the effective use of the metaverse.
4. **Financial Restrictions:**
    - Inefficient use of financial resources, especially subsidy titles. More generally, worse use of alternative sources of financing (e.g. PPPs).

### Opportunities

1. **Development of new services at the national level:**
    - The metaverse can offer new ways to interact and communicate with citizens, such as visualizing urban projects and virtual services for less mobile people. New services such as citizen identity can accelerate the development of new services.
2. **Better accessibility of the city:**
    - The implementation of modern technologies such as the metaverse can increase the attractiveness of a city for tourists and new residents, which can have a positive impact on the economy and quality of life. Better physical accessibility can bring new professionals to the city.
3. **Promoting innovation and entrepreneurship:**
    - The metaverse can attract tech start-ups and drive innovation in the local economy, especially in the areas of IT and creative industries.
4. **European funds:**
    - The use of European funds and subsidies can help finance projects related to the implementation of metaverse technologies and support for digital transformation.

## Threats

1. **Low penetration technology:**
   - o End-user end-user technical equipment is essential for the wider expansion of metaverse services. Existing mainstream ICT assets can only replace metaverse resources at the cost of significantly reducing the user experience,
2. **Cyber threats:**
   - o The existing problems with the security of ICT environments are also reflected in metaverse environments. In addition to threats of a technical nature, such as data theft, the threat of social engineering is also significant.
3. **Rejection of technology:**
   - o The immersive virtual or augmented reality environment is not accessible to some users due to physiological (VR sickness) or due to distrust in the metaverse and virtual reality as a whole.
4. **Changing political priorities:**
   - o A change in priorities at national or European level may lead to changes in the financing of innovative projects. International relations can also have an impact on the availability of services and tools in the European environment.

# URBACT LOCAL GROUP in Písek

**URBACT Local Group (ULG)** is a key component of URBACT projects that support sustainable urban development in Europe. URBACT is a European programme aimed at improving urban policies and strategies through the exchange of experience and good practice. The programme focuses on:

1. **Sharing and learning:** Promoting cooperation and sharing of experience between cities.
2. **Capacity building:** Improving the capacity of local authorities and organizations to plan and implement urban projects.
3. **Innovation uptake:** Supporting the implementation of innovative solutions in cities.

The ULG is a group of local actors that includes representatives of city authorities, civic initiatives, businesses, academic institutions and other relevant organizations. The main objective of ULG is to collaborate on the development and implementation of local projects in line with the objectives of the URBACT programme.

ULG in Písek has identified several key problems and challenges associated with the implementation of modern technologies, especially virtual reality (VR). The main problems include the financial demands of the projects and the need to ensure access to technology for a wide range of people. Projects should be targeted at specific groups, such as seniors or tourists (visualization of the old bridge), and should be low-cost and widely available. The use of VR in the public sector to improve decision-making processes and modelling of the territory (digital twin) also plays an important role, with an emphasis on accessibility so that they are accessible to all. The integration of new technologies requires the active involvement of the population and their education so that new technologies are effectively adopted. Social aspects are also important, such as the use of VR to support the mental health of seniors, and ensuring access to technology for vulnerable groups. Solving these problems is necessary for the successful implementation of technological projects in the city of Písek.

Členové skupiny:

1. **V. Blažek:** University of South Bohemia, specialization in geographic information systems (GIS). (academic institution)
2. **M. Prokýšek:** Smart Písek, University of South Bohemia, focuses on modern IT technologies (public administration, academic institution)
3. **M. Ješetová:** City of Písek, city architect, specialization in spatial planning (public administration)
4. **P. Trambová:** City of Písek, 1st Deputy Mayor, Urban Planning (Public Administration)
5. **O. Fučík:** Robology, private company, IT start-up. (private company)
6. **J. Roučka:** Smart Písek, project manager (public administration)
7. **J. Houzimová:** South Bohemian Centre for the Disabled and Seniors o.p.s (non-profit organization)
8. **R. Fouček:** City of Písek, Spatial Planning (Public Administration)
9. **K. Holý:** Secretary of the City of Jindřichův Hradec (public administration)
10. **V. Král:** Atelier Česko, (private entity)
11. **L. Mašková:** Destination Company Píseckem s.r.o. (municipal organization)
12. **B. Bernášek:** Prácheň Museum in Písek (contributory organization)

# Small Scale Action (SSA)

URBACT Small Scale Actions (SSAs) are pilot projects that enable cities to test new solutions to urban problems. The aim is to verify the effectiveness and benefits of these solutions before their wider application, which helps to reduce risks and gain valuable insights for urban policymaking. Projects focus on areas such as cultural inclusion, waste management and sustainable development. SSAs encourage experimentation and public participation in decision-making.

As part of the project, the city of Písek decided on one main event – an interactive visualization of the Old Bridge, which serves not only to support tourism and promote cultural heritage, but above all as a pilot project for the use of advanced digital technologies and work with spatial data in the city.

## Visualization of the Old Bridge

During our visit to Budapest as part of the CNM meeting, we had the opportunity to take part in a virtual tour of the city, which left a strong impression on us. Virtual reality technology can convey the atmosphere of historical sites so realistically that visitors feel as if they are actually walking through the streets of the city. This experience brought us inspiration to use a similar approach in Písek. We believe that modern digital technologies can significantly revive the city's cultural heritage and at the same time strengthen its tourist attractiveness.

As part of our activities, an interactive visualization of the Stone Bridge, one of the most important historical monuments of Písek, is being created. We are cooperating on the project with the Prácheň Museum, which owns a 3D model of the bridge from around 1500, created by Jan Adámek. This model forms the basis for our visualization, which aims not only to present the beauty of this building, but also to bring its history closer, including key events.

*Source: Photograph of the model of the city and the Stone Bridge in the Prácheň Museum in Písek, author: Miloš Prokýšek*

The visualization will also include a dramatic story from 1768, when a great flood tore down one of the original bridge towers along with the herald. This element will contribute to an authentic experience while reminding us of the bridge's resilience in the face of the elements.

At the same time, the project has an educational dimension – the visualization will be available not only in the VR environment, but also on mobile devices, so visitors will be able to view it on site.

In the future, we plan to expand this approach to other places in Písek, for example in connection with local legends or scary stories. We believe that such interactive experiences not only educate, but also enrich the tourist offer and support the local economy.

## Visualization content

The visualization of the Stone Bridge brings closer the dramatic moment from 1768, when one of the bridge towers collapsed during a great flood together with the herald. This story represents a major event in the history of the bridge while also showing its resilience to the elements.

Our goal is to convey this historical moment to visitors as faithfully as possible through modern technologies. Visitors will be able to view it both in virtual reality and on mobile devices, directly on site or from anywhere else. This form of processing offers an engaging and at the same time educational view of one of the most important monuments of Písek.

*Source: Fig. 19 | A new hypothetical model of the Stone Bridge in Písek and its right-bank foreground for the period around 1500. The model was installed in the exhibition in 2021. According to the author's documents, it was created in 1:155 scale in the form of 3D printing by Radim Kníř (Studio Quin.cz). Prácheň Museum in Písek, Activity Report, 2021.*

## Implementation and cooperation

The city of Písek cooperates with the Destination Company Píseckem, s.r.o., which manages the city information center and focuses on the promotion of Písek as a tourist destination. Its aim is to help ensure that the visualization reaches the widest possible range of visitors and supports the development of tourism in the city.

The technical solution of the project is provided by Digital Media, a company specializing in the creation of 3D visualizations. The resulting visualization will be available both through VR glasses, which will offer a fully immersive experience, and via mobile devices, which will ensure its wide availability.

## Description of the creation of the 360° visualization of the Stone Bridge

The creation of 360° video is the result of a complex process that combines historical research, digital modeling and state-of-the-art visualization technologies.

**1. Historical research and preparation of documents**

The first step is the collection and analysis of historical materials. In this case, the visualization was based on professional cooperation with the Prácheň Museum, which provided a 3D model of the bridge from around 1500. On the basis of these documents, the form of the bridge was created so that it corresponds as closely as possible to the real historical environment.

**2. Create 3D models and scenes**

Based on historical data, a complete 3D model of the scene was constructed, including the bridge, the surrounding landscape, the river, the buildings and natural features. The models were complemented by realistic textures and details such as stone, wood, water or ice floes.

**3. Flood animation and simulation**

A key part of the process was the animation of the collapse of the tower during the flood. A physics simulation was used for this part, which faithfully imitates the movement of water, the destruction of structures and the movement of debris in the river flow. The scene also features a simulation of rain and the movement of ice floes on the water surface, which adds to the realism of the whole experience.

**4. 360° camera setup**

After creating and animating the scene, a virtual 360° camera was set up. It records the image in all directions at once, in the so-called spherical (equirectangular) projection. The camera is positioned so that the viewer has the feeling that he is standing right on the bridge, from where he is watching the whole event.

**5. Video Rendering and Calculation**

The finished scene is then rendered, which means that the computer calculates the individual frames of the animation into the final form of the video. Due to its high quality and demanding effects (water, rain, destruction), this process takes long hours to days. The resulting video has a high resolution to keep it sharp even when projected in VR.

**6. Sound and finishing touches**

The project also includes the addition of realistic sound – the murmur of the river, the crackling of wood, the sound of rain or the collapse of a tower. The soundtrack can be spatial, i.e. respond to the direction of the viewer's gaze in VR. Finally, color fine-tuning and contrast adjustment take place.

**7. Distribution**

The final video is exported in a format suitable for 360° players and uploaded to available platforms. Visitors can view it either with VR glasses for a fully immersive experience, or through mobile devices or computers, where the image can be rotated as needed.

You can see the visualization here:

https://www.youtube.com/watch?v=iSVfAKNTYVs&ab_channel=DigitalMediaCZ

*Source: Printscreen from the SSA video – Bridge Fall*

However, an important benefit of this project is not only the visualization itself. Thanks to it, the city has gained valuable data and materials, which now serve as a basis for further work with advanced digital technologies and spatial data. These documents allow the city to independently modify existing visualizations, create new projects and systematically develop the skills of its employees in the field of working with 3D models and visualizations. This opens up opportunities to use these tools in other areas, such as public space planning, presentation of development projects or processing of historical data.

At the same time, thanks to the active involvement of ULG members, other ideas for the use of SSA outputs are emerging. One of them is, for example, a competition for primary school pupils who would create models of historical or contemporary buildings in Písek. These models could then be 3D printed and incorporated into a physical historical map of the city.

# Conclusion

The METACITY project represents an important step for the city of Písek in the field of digital transformation and modern communication with the public. Involvement in the project allowed the city to verify the possibilities of using advanced digital technologies in practice and at the same time assess their benefits, limits and demands for long-term management. The outputs of the project do not represent an isolated technological solution, but build on existing strategic documents and the long-term direction of the city's development in the field of Smart City and digitization.

The URBACT programme provided the city with a methodological framework for the structured preparation of the Integrated Action Plan and created space for systematic work with other partners. Thanks to the involvement of the URBACT Local Group, it was possible to continuously confront proposals for measures with the needs of practice and to obtain feedback from representatives of public administration, the professional public and other partners. This approach has contributed to the fact that the resulting action plan reflects the real possibilities of the city and is sustainable in terms of personnel and financial capacities.

It can be stated that the metaverse as a concept originally defined in the science fiction literature of the 1970s is our present. Despite reports of a reduction in investment in this technology by large companies like Meta in the coming months, it is still a very promising technology and the public sector is still learning how to handle it. From our experience, it is clear that this is not a revolutionary technology, but a natural complement to existing means of communication. The metaverse is unique primarily for its unsurpassed sense of immersion and distant presence, which are achieved through a functional combination of content and technical means of display.

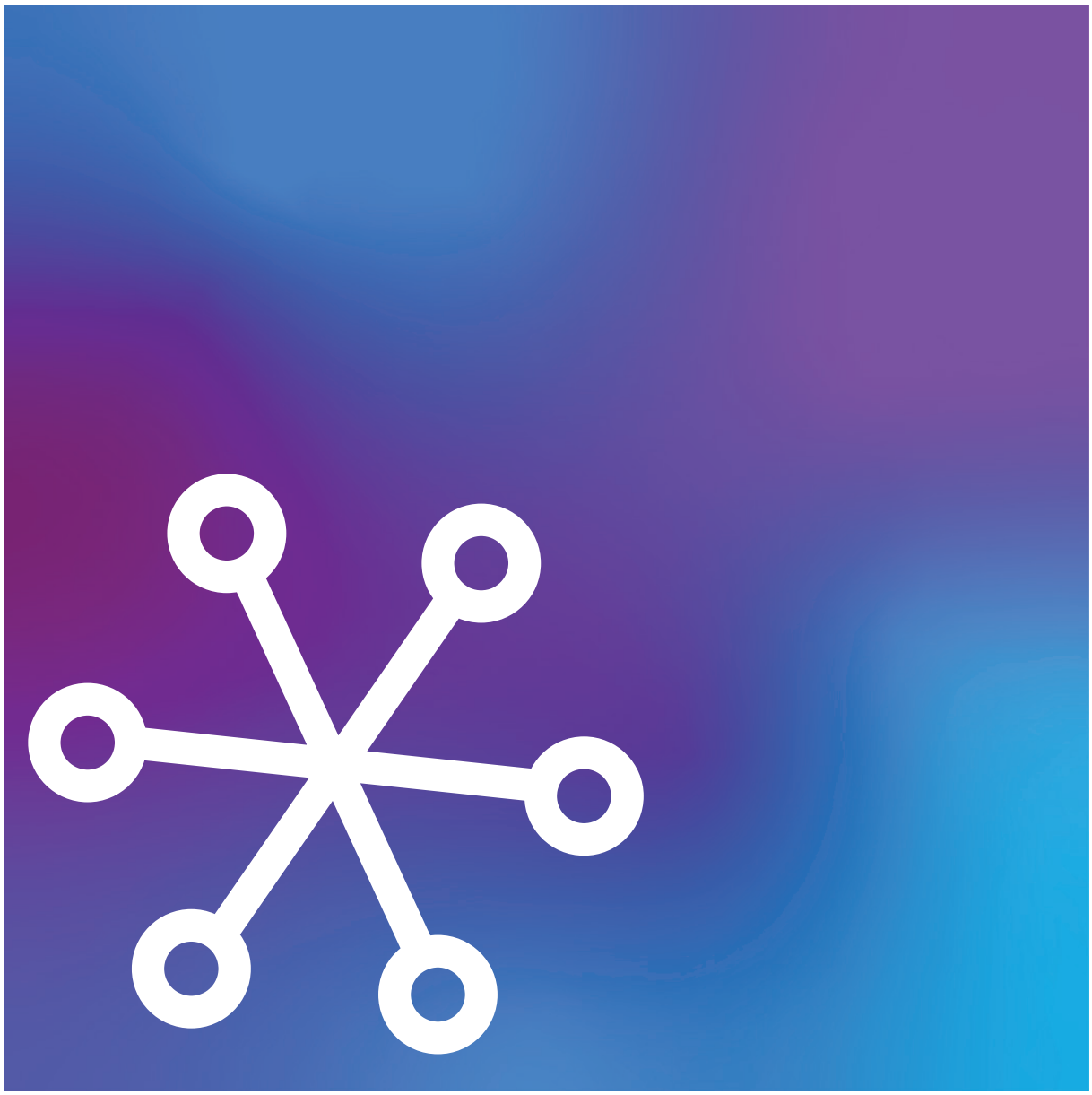
A pilot test carried out as part of the project, focused on the visualization of the Stone Bridge, showed that virtual reality and metaverse technologies can be meaningfully used not only in the field of tourism, but also as a tool for working with spatial data, presenting development plans and education. The experience gained in this activity provided the city with valuable materials for further decision-making on the use of these technologies, especially in citizen-city communication.

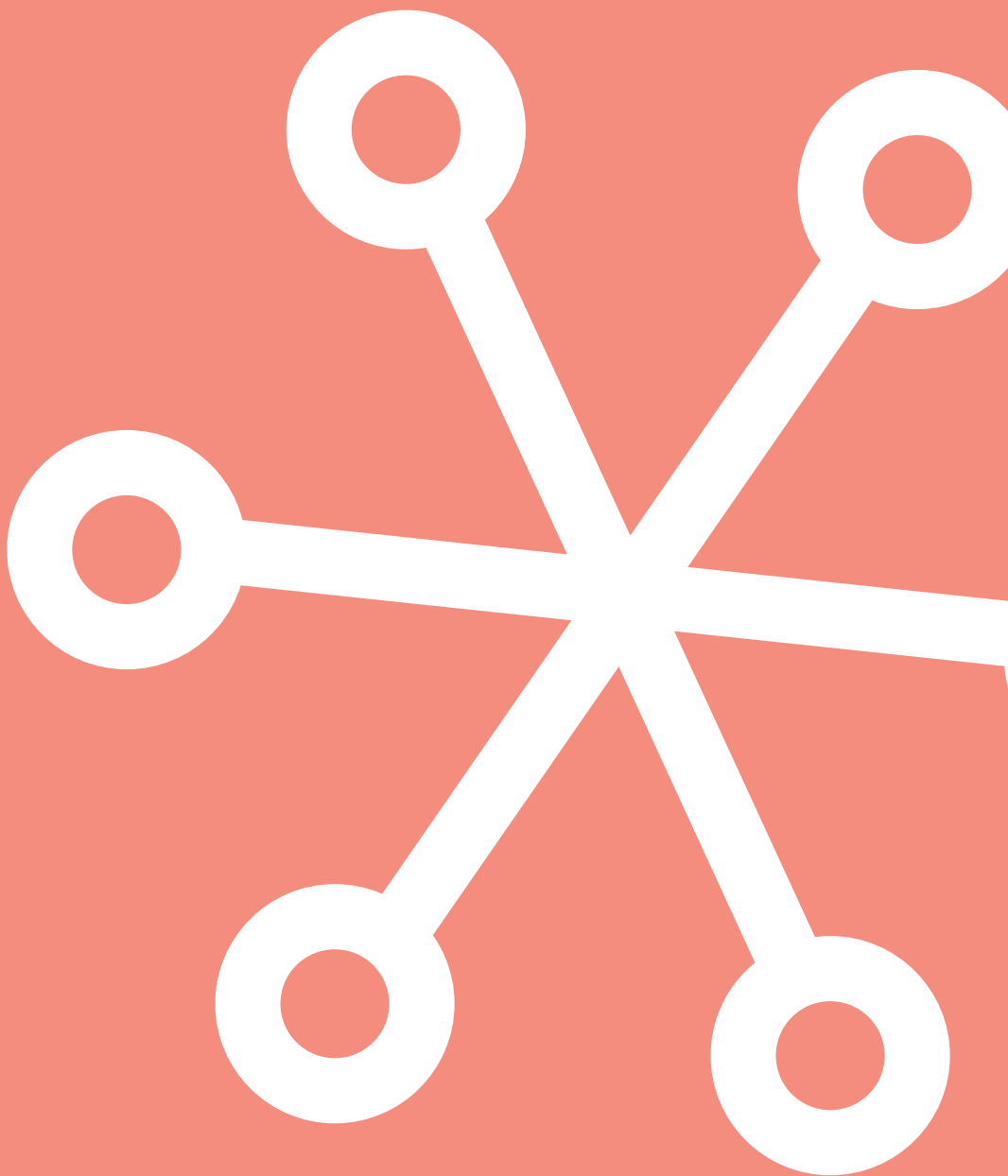
An important benefit of the project is its connection to the city's existing initiatives, especially the Smart Písek concept and projects focused on digital twins and working with data. METACITY thus expands existing approaches and brings new possibilities for their use without creating parallel or isolated solutions. This approach reduces the risk of inefficient spending of resources and supports the long-term sustainability of project results.

The METACITY project has also contributed to strengthening cooperation between the city and other local and regional partners. The involvement of cultural institutions, educational organizations and technology companies has shown the potential of interdisciplinary cooperation in the development of innovative projects. This

way of working can also be used in other areas of city development in the future. What was surprising was the great willingness of the partners to actively participate in the development of the city.

In conclusion, it can be stated that the METACITY project has brought the city of Písek practical experience in the use of modern digital technologies and created the basis for their further development. URBACT has played an important supporting role in this process, allowing for the systematic preparation of an action plan and the involvement of relevant actors. The acquired knowledge and outputs of the project represent a usable basis for the city's next steps in the field of digitization, communication with the public and the development of Smart City, while the emphasis remains on the real benefits for the city's residents and the long-term sustainability of the proposed solutions.





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