

# City of Ulm Intelligent City Transformation Overview

ICC Final Deliverable

August 2022



# Executive summary

As a medium sized city, Ulm faced limited resources and expertise within the administration the follow up on smart city developments including best practices. However, with additional efforts and equipped with learnings from previous projects (Zukunftsstadt and Zukunftskommune) Ulm was selected as one of the first “Smart Cities- Made in Germany” model cities in 2019.

By laying a strategic foundation and implementing smart city solutions, Ulm takes its challenges in terms of constant changes (demography, socially, economically); climate change, resilience and data. This development was enriched by the ICC programme. Throughout the programme, Ulm focused on the solutions related to open government, smart security and digitalization of public services. All of them show a positive level of implementation with some constraints for the topic of smart security, that continuous to be part of the agenda, still.

Also Ulm faced some challenges during the ICC, in particular capacity constraints, the need to re-prioritize activities due to elections and pandemic impacts. However, Ulm benefitted from the ICC cities’ profiles to identify complementary partners, from the peer-review sessions and from a collaborating group made up of 5 ICC cities.

For the next 3 years, Ulm will capitalize on well-established structures of the city’s ecosystem building on prior cooperation. The stakeholder network will remain a primary source for further implementing and monitoring smart city solutions. In the coming months the city will kick off the next ideas submission phase within the federal co-funding program "Model Projects Smart Cities" (under the responsibility of the Federal Ministry of Housing, Urban Development and Construction - BMWWSB).

# Mayor Foreword

*The ICC Network with its programme provided Ulm with a unique platform in three ways: presenting Ulm as a Smart City and City of the Future, self reflecting what is going well and where there are opportunities for improvement, and exchanging and learning from other cities.*

*The solutions presented by the city of Ulm show an overall positive level of implementation. What matters is their integration into an overarching smart city concept for the city and its citizens. The ICC network has given us additional breath of fresh air for pursuing this path, in which digitalization is not an end in itself, but always serves a concrete purpose, e.g., to advance the mobility and energy transition.*

*We can build on Ulms' smart city strategy that has been adopted by the municipal council in autumn 2021. It sets directions for Ulms' strategic digital transformation for the next 10-15 years. Ten concrete projects are currently implemented based on the this strategy, for example Smart greening of districts, Talking Trees, Sensor-based parking management and a Digital Guidance System installed citywide.*

*We are thankful for the support provided and the opportunity to look beyond our own neighbourhood boundaries, and for being part of the international cities' and experts' network ICC.*



Source: Digitale Agenda Office – City of Ulm

**- Gunter Czisch, Lord Mayor of Ulm -**

# The city of Ulm pursued an EU-supported transformation over four main stages, and this document details that journey by these sections

Overview to the city's journey and structure of this document



## 1 Preparation & assessment

5 months:  
September 2020 – January 2021



## 2 Ambition & roadmap

3 months:  
February 2021 – April 2021



## 3 Implementation

15 months  
May 2021 – July 2022



## 4 Review & way forward

2 months  
August 2022 – September 2022

*Reported  
as one  
section:  
Impact*

### Summary

Find out **where a city is, where it should go** and who in the ecosystem is going to **mobilize make things happen**

Develop a **concrete plan** to achieve **measured improvements**, collaborating with the community; push action with immediate benefits

Get “big moves” **done** and **see results**; take **action in partnership** with others

Measure success, and commit to **keep connections and improvements going**

Section

1

# City of Ulm: Preparation and assessment

ICC transformation

September 2020 to January  
2021



# Introduction

Ulm, a city of 126.000 habitants, former home of Albert Einstein, is strategically located on the development axis Munich - Stuttgart and has a special position as one of the most dynamically growing economic regions in southern Germany. From 2022, Ulm will be connected to a new high speed train line with Stuttgart Metropolitan Area and its airport ("Stuttgart 21"). The region is characterised by a healthy mix of industries with companies of various sizes. Furthermore, there is a strong collaboration with the city of Neu-Ulm on the Bavarian side of the Danube River. Neu Ulm's has a population of about 59.000, together they account for almost 200.000 habitants. About 85.000 people commute to Ulm and Neu-Ulm every day.

## Key Facts (2018):

Population: 126.000

Growth of population per year: 11.680 (9.2%)

Unemployment rate: 3.8%

Gross domestic product per inhabitant: 73.554 €

**A Major Business Location between Stuttgart and Munich** About 10.000 companies are located in Ulm, offering around 80,000 jobs at a population of 126,000 inhabitants. Building materials, metal processing, commercial vehicles, electrical engineering, pharmaceuticals and security are the dominant sectors in the regional economy. Well-known brands such as Ratiopharm, Airbus S.A.S, Daimler Buses, Magirus, Zeiss, and Liebherr are located in the region around Ulm.

# City needs: State of the city overview

## The state of Ulm today

For 30 years, the City of Science, a research campus, has been hosting a growing number of research institutes and University of Ulm (UUM) faculties. Additionally, R&D centres of Daimler, BMW, Continental and Nokia have settled in the location. In total, the City of Science, including the hospitals, offers employment to around 12.000 people. About 12,000 students study at its universities. So far, over 200 million euros have been invested in Science Park II alone, and around 2,500 new jobs have been created over the last years.

Ulm has also become one of Germany's centres of hydrogen research, hosting the Helmholtz Institute Electrochemical Energy Storage (HIU) and the Centre for Solar Energy and Hydrogen Research (ZSW) in Baden-Württemberg. Furthermore, there is a strong collaboration with the University of Neu-Ulm (HNU) on the Bavarian side of the Danube River.

ICC goals generally overlap with research areas such as Digital Transition and Entrepreneurship (HNU) or Sustainable Leadership (UUM) or the joint project

## Key insights from city performance analysis

### Higher performance observed

- 1 **Security** : Smart City solutions addressing urban development and services, e.g. fear causing public spaces or response/prevention by police

- 2 **Smart & Green Mobility & Transport:** Addressing sustainable public transport, particularly focusing on hydrogen mobility.

- 3 **German Smart City Lighthouse** In 2019, Ulm has been selected as one of the first "Smart Cities- Made in Germany" model cities. Additionally Ulm represents one of four digital flagship projects within the "Zukunftskommune @ bw" programme and is the only city in southern Germany, that won the federal competition "Zukunftsstadt Ulm 2030".

### Lower performance observed

- 1 **Digitalization & Knowledge transfer challenge:** there is a lack of smart city model cities or networks in Germany. The exchange on a European level is therefore crucial to follow up on developments and to learn from the best.

- 2 **eGovernment and digitizing public services:** Fast-track development and implementation of post- corona measures as well as learnings from best practise is required.

- 3 **Growing startups, SMEs and; social economy:** Requires a cultural change and a better breeding ground for ideas. The benefits need better visibility and (psychologic) barriers need to be reduced.

- 4 As a medium sized city **resources, capacity and especially expertise are limited** within the administration which clearly restricts the scale of relevant topics. Consequently, there is a need to build expertise and to extend the city's network in order to inspire and develop new ideas.

# City Ecosystem

Summary of findings from the stakeholder engagement workshop, local ecosystem enablers and 1:1 interviews and in particular:

## Key topics for discussion

- **Shared aspirations and vision** – do all stakeholders see the city in the same light and believe we are already on a journey?  
→ conceptually yes, visibility though can be improved by practical implementations
- **What we bring and how we work together** – what capabilities are different parties bringing to the party? Do we work together well in ecosystem situations?  
→ Yes, good prerequisites with city ecosystem of start-ups, academic/ research institutions and city administration
- **Urban resources for transformation** – does our wider city more broadly have the typical assets needed for a major transformation like access to capital, a skilled labor force and critical thinking  
→ Yes in terms of access to capital (mainly co-funding)



# ICC strategy: Vision and ambition statements – 2nd and final approach after adaptation

City vision: ‘Der Ulmer Weg’ – The Ulm Way

## Ambition #1: Transformation city.

The city is subject to constant change. It is important to actively shape the change and find clever, digital answers: especially in the areas of demographic change, social cohesion, housing needs and economic innovation. Ulm also sees itself as a centre for knowledge and employment in the future.

## Ambition #2: Sustainable urban development and circular economy.

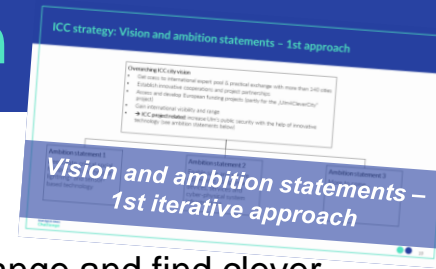
The climate policy measures that Ulm has been taking for 20 years can be significantly improved by linking them to new digital opportunities. The city is striving to become almost climate-neutral, to expand recyclability and thus to conserve valuable resources. The social, economic and ecological side of sustainability provides the framework for digitalization activities.

## Ambition #3: Resilient City.

Ulm is a growing city that will move closer to the metropolitan regions of Stuttgart and Munich from 2022 due to the new high-speed railway line. As a result, the city has to adapt to challenges for the environment, land consumption and housing due to an influx of people and increasing commuter flows.

## Ambition #4: Data Handling.

To give every citizen the chance to move in a self-determined way in everyday digital life, the urban data space ensures that data remains within the sovereign domain of the city and is used according to the city's rules on data handling. The technological sovereignty of the city and the citizens is ensured.



# Der Ulmer Weg zur Smart City

Clever. Offen. Für alle. Nachhaltig.

**Projekt: Ulm4CleverCity**

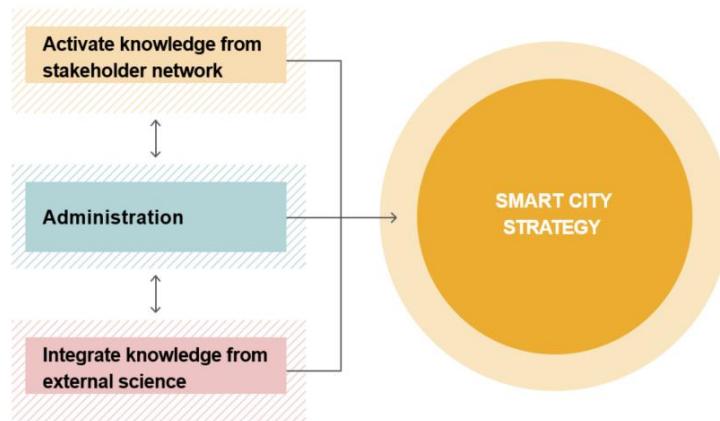
## City strategy: justification

The ICC strategy complements the path that has been prepared over the last few years by lighthouse projects such as "Zukunftsstadt" - City of The Future (Federal Ministry of Education and Research) and "Digitale Zukunftskommune@BW" - Digital Municipality of The Future@bw (digital@bw). The first one focused on elaborating citizens needs and answering them with different scientific IoT-based solutions, while the second project elaborated smart city solutions at district level. Both found there way into Ulms' smart city strategy that has been developed in parallel to the ICC path through the years 2020/2021 with Ulm being one of the first "Model Projects Smart Cities" of the Federal Ministry of the Interior and Community (BMI).

# City strategy: justification

If you could boil down your strategy to some thoughts that have best guided you on your way, what would they be?

- 1) The key to success on the path to becoming a sustainable, liveable and intelligently networked city lies decisively in the collaborative and co-creative integration of the urban ecosystem of citizens, science, economy, municipal administration and businesses.
- 2) The willingness to learn from each other and to try out various things is necessary.



What are the key factors that define success across all of your solutions?

- 1) **Understand Intelligent Transformation as a holistic process:** It does not focus on technological solutions as such, but rather links them to analogue challenges and needs as well as the political and strategic goals of the city. In addition, standards and concepts are derived, such as guidelines in the area of Open Data or the Data Ethics Concept.
- 2) **Participatory Development process:** Silos are to be broken down and citizens participate actively in the development process. The City of Ulm uses the so-called Twinning Model. This states that scientific expertise is brought together with local stakeholder thinking (representing also citizens' needs). The respective stakeholders and scientists then agree on the content together.
- 3) **Considering technical fundamentals for the solutions implementation,** such as data infrastructure (networks, sensors, etc.), data specific goals and data excellence organisation.
- 4) **Considering organizational and cultural fundamentals for the solutions implementation:** Increasingly complex challenges require a new understanding of organisation, which the city intends to shape proactively and responsibly. This requires additional, partly transversal competencies in the areas of (1) open government, (2) culture of innovation, (3) project management, (4) (IT) procurement, (5) data culture and data competence, (6) technical know-how, (7) user orientation, (8) involvement of citizens, and (9) further development of regional business and science.

Section  
2

City of Ulm: Ambition and roadmap

ICC Transformation

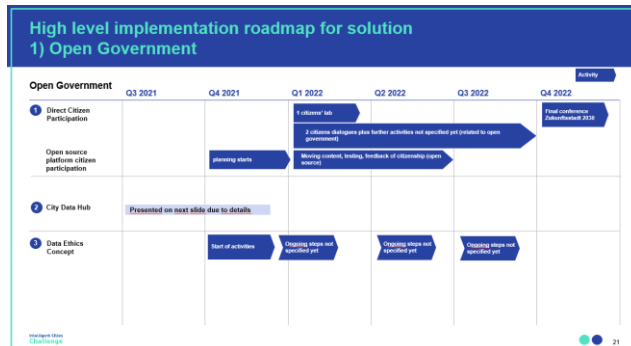
February 2021 to May 2021



# Roadmap Summary\*

Overall, the three solutions (S1 to S3) vary in maturity due to the consequences of the pandemic, they complement each other and contribute to the SDGs.

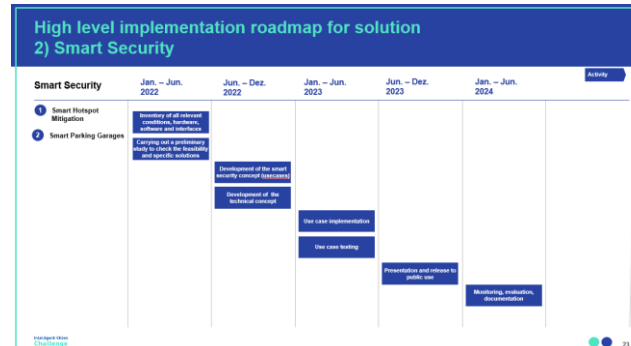
- In S1 – one initiative is very mature, while another one is in ramp-up phase and still ponders the consequences of a newly enforced law<sup>1</sup>
- In S2 – one pre-pandemic initiative has been restarted while another one is ready-for-ramp-up except from set-up questions.
- In S3 – both initiatives are mature, but need a conceptual base and/or plans for further implementation & continuation



- Initiative 1.1 Direct Citizen Participation is in ramp-up phase
- Initiative 1.3 Data Ethics Concept is close to operationalization phase

Retrospective

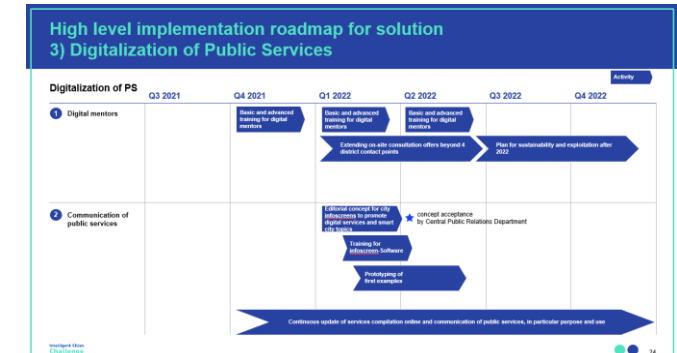
-> Direct citizen participation is considered of transversal importance to all future smart city initiatives. It is also reflected in the Open Government approach at conceptual stage. The operationalization of data ethics is on hold, but the concept itself is approved and drawn back to.



- Initiative 2.1 Smart Hotspot Mitigation is ready-for-ramp-up; org. issues need to be resolved
- Initiative 2.2 Smart Parking Garage has been restarted

Retrospective

-> Both initiatives did not reach implementation level.



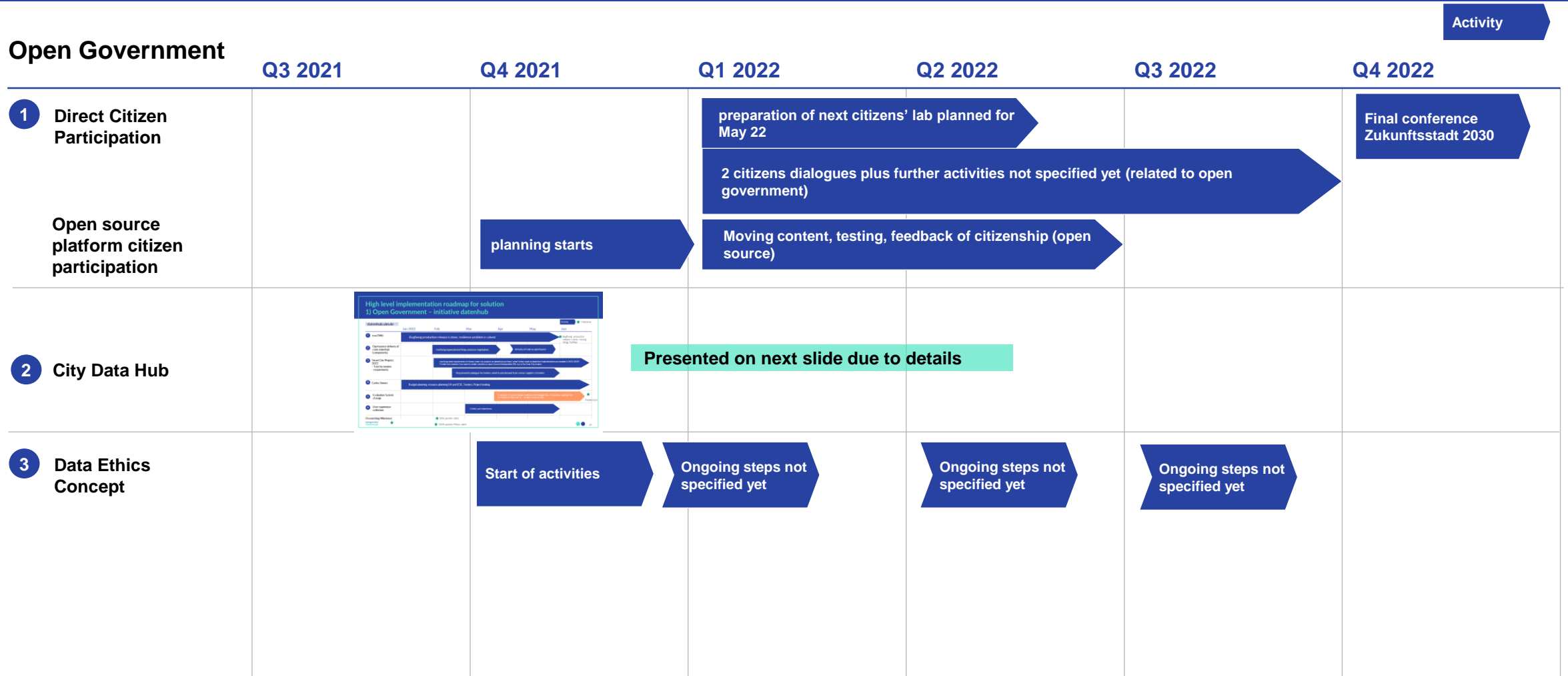
- Initiative 3.1. Digital Mentors is operational but needs continuous development and continuation
- Initiative 3.2 Communication of public services is ready for ramp-up, but needs conceptual ground

Retrospective

-> The development of the Digital Mentor programme was developed and implemented by scientific and civic partner, it will be continue with municipal support.

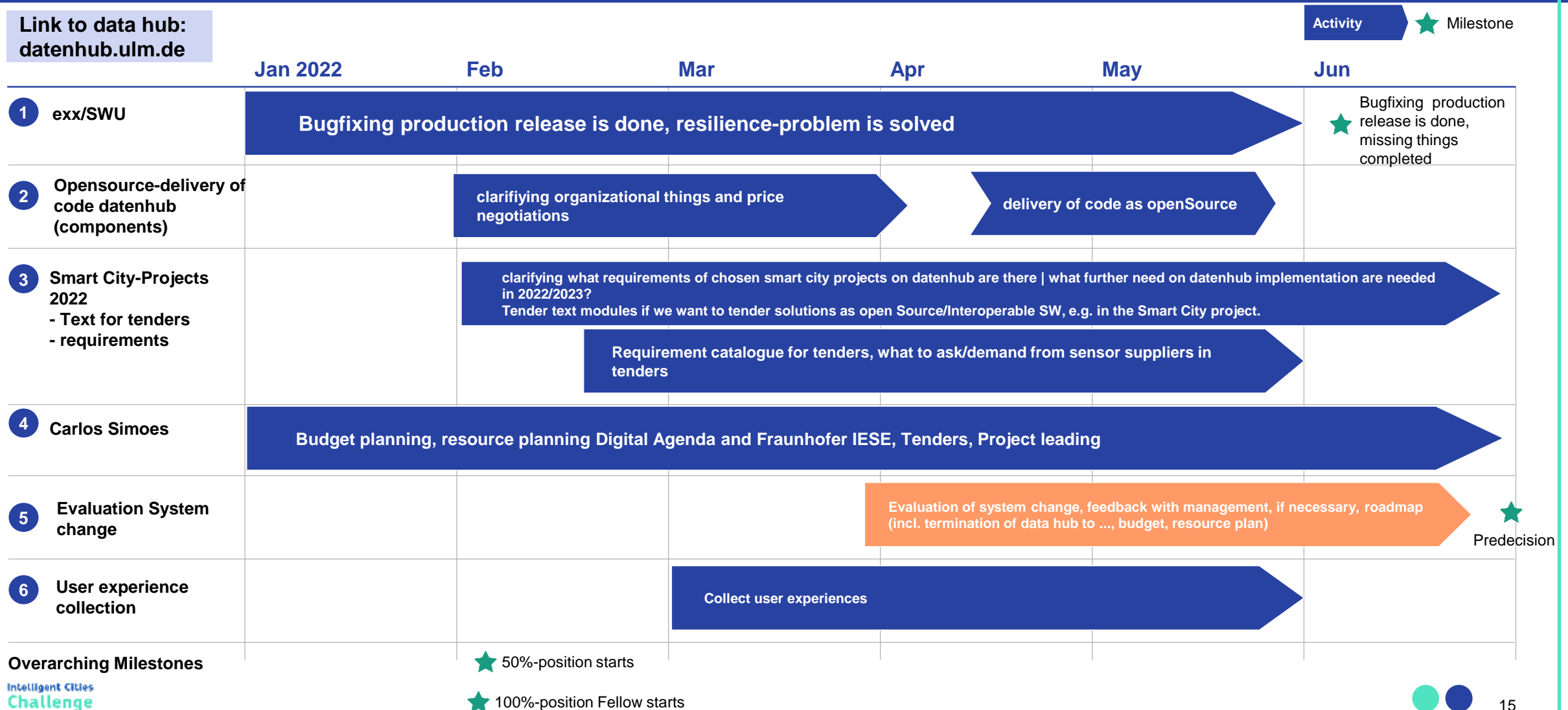
# High level implementation roadmap for solution

## 1) Open Government














# High level implementation roadmap for solution

## 1) Open Government – initiative datenhub



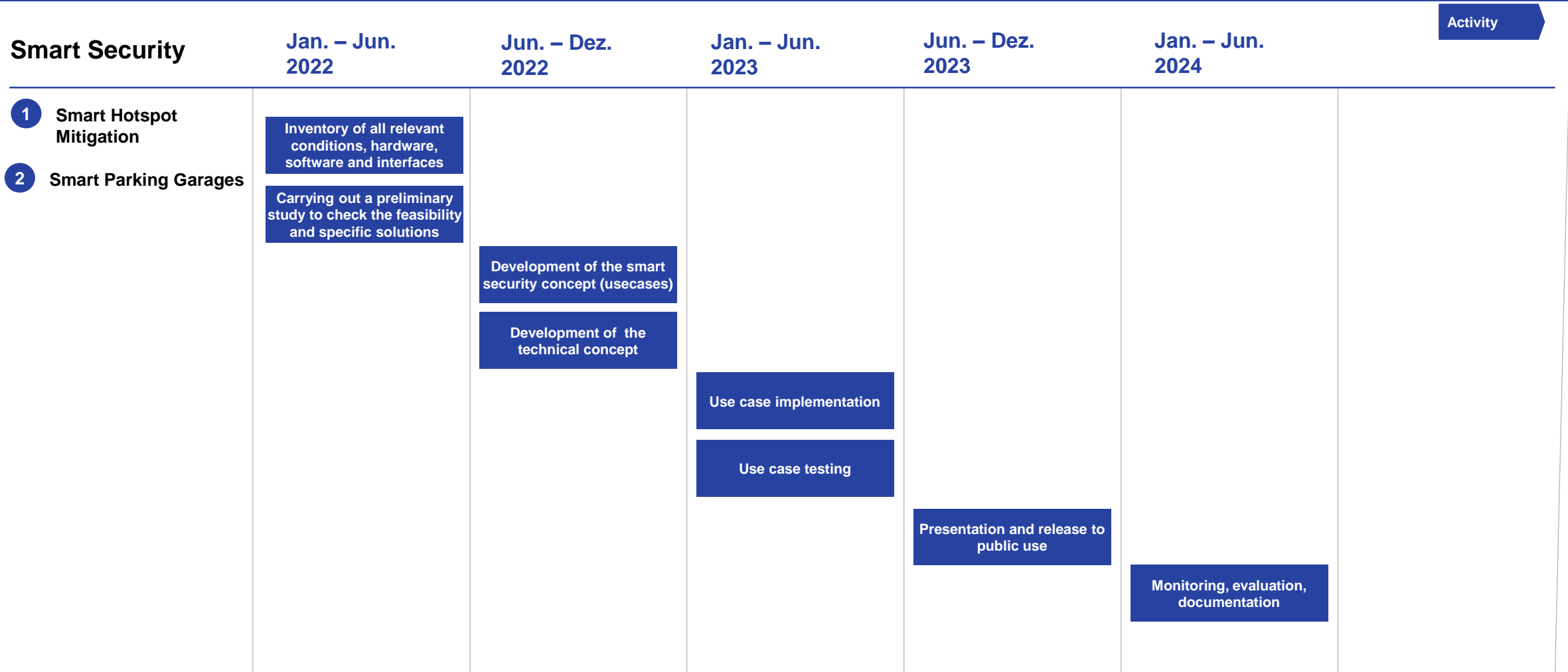
# 1 Initiative charter 1) Open Government

Strategy	Stakeholders involved	Inputs, outputs, outcomes and impacts
<p><b>Description</b></p>  <p>What: direct citizen participation, data hub and data ethics concept</p> <p>Why: democratic approach with open data</p> <p>How: different formats for citizens' participation, providing urban data to the public, guidelines on limits and purposes of data use</p>	<p><b>Solution lead:</b> Digital agenda office at city administration</p>  <hr/> <p><b>Solution working team:</b> Digital agenda office at city administration</p> 	<p><b>Source of funding and estimated cost</b></p> <p>Federal level: Federal Ministry of Education and Research; Federal Ministry of the Interior, Building and Community; own funds, Federal ministry of the State of Baden-Wuerttemberg</p> 
<p><b>Link to vision</b></p>  <p>Transformation City, Resilient City, Data handling</p>	<p><b>Contributors:</b> Scientific project partners, local associations, education providers, citizen initiatives, media partners, private companies and community</p> 	<p><b>Solution maturity outputs</b></p> <p>Online participation platform in place (at the moment screening of new platform)</p> <p>Data platform: bug fixing until 06/22, later visualization is envisaged, increase in new datasets and use cases necessary</p> 
<p><b>Link to ambition statement</b></p>  <p>Adaptation of ambition statement New: Give every citizen the chance to move in a self-determined way in everyday digital life, including involvement in the cities development</p>	<p><b>Risks and mitigation</b></p>  <p>Participation formats: Scope of reach, inclusiveness, COVID19 for mobile on-site dialogues -&gt; approach by milieus and needs</p>	<p><b>City performance outcomes and impacts</b></p> <p>Reduced concerns about digitalization; citizens feeling addressed with digital initiatives; problem-solving approach has been piloted (change in approach), open data approach has been followed consistently (github etc.)</p> 
<p><b>Expected impact and timing</b></p>  <p>Participation formats: The collection of needs of citizens to generate acceptance for smart city measures among them is currently ongoing.</p> <p>Data hub: After technical acceptance finalization incl. bug fixing until 06/22.</p> <p>Date ethics: Derivation of concrete measures for application end of 2022.</p>	<p>Data hub: Parallel platforms (demarcation to "Datenportal platform" not clear) -&gt; no further strategy on that</p> <p>Data ethics: Little acceptance and transfer of data ethics concept into daily routines of city administration staff -&gt; communication initiatives eg. via learning lab, adaptation according to citizen feedback</p>	














# High level implementation roadmap for solution

## 2) Smart Security

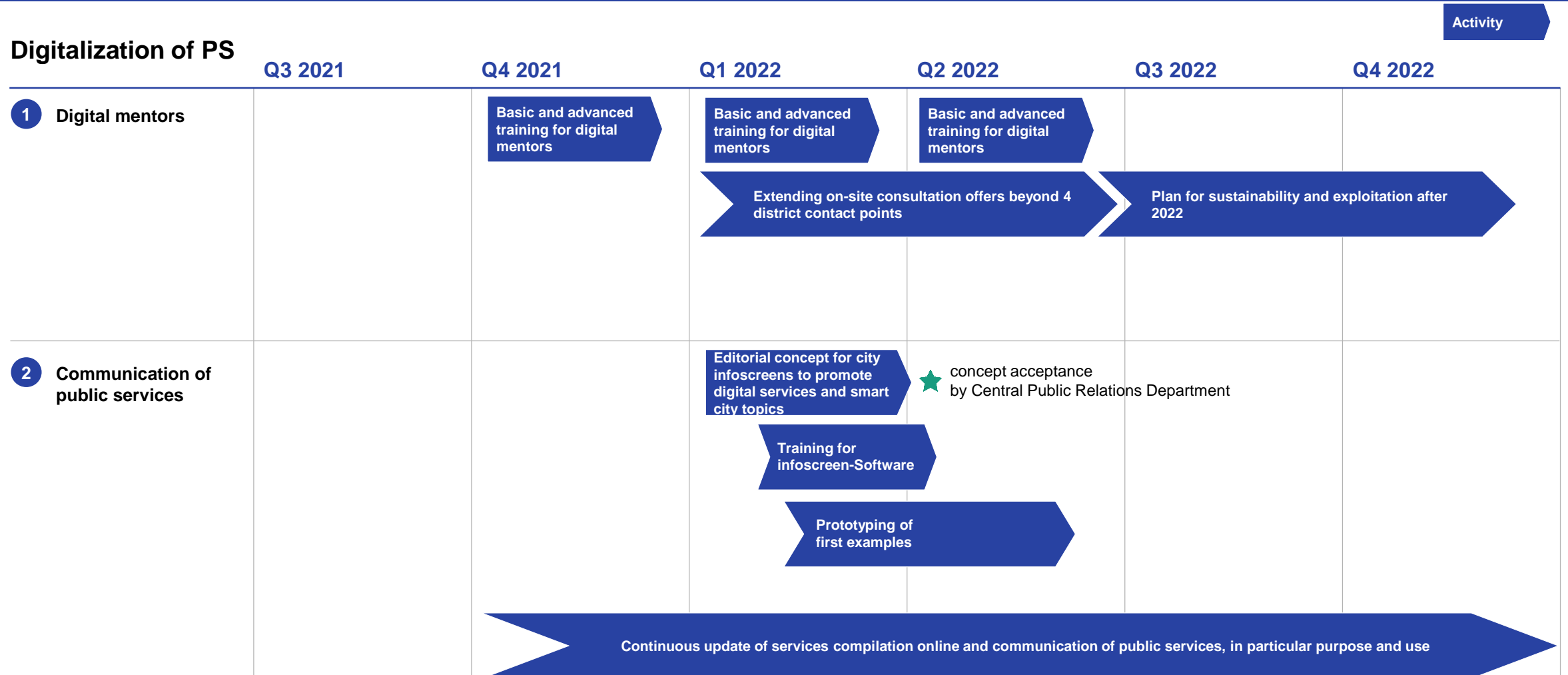


# 1 Initiative charter 2) Smart Security












Strategy	Stakeholders involved	Inputs, outputs, outcomes and impacts
<p><b>Description</b></p>  <p>What: smart crime hotspot mitigation, smart parking garages</p> <p>Why: making citizens feel and be more secure at critical hotspots</p> <p>How: implement a smart lighting concept for a specific crime hotspot in Ulm, the Donauwiese (green area along the Danube)</p>	<p><b>Solution lead:</b> SmartSEC GmbH, Digital agenda office at city administration</p>  <p><b>Solution working team:</b> SmartSEC GmbH, Future Act Team, Digital agenda office at city administration</p> 	<p><b>Source of funding and estimated cost</b></p>  <p>Crime hotspot mitigation: 200.000 Euro, Public funding with co-financing</p> <p>Smart parking: funding secured - 890.000 Euro, Public funding (Federal Ministry of the Interior, Building and Community) with co-financing</p>
<p><b>Link to vision</b></p>  <p>Resilient City</p>	<p><b>Contributors:</b> Police Department Ulm, Division Order and Security of the City Ulm, Citizens</p> 	<p><b>Solution maturity outputs</b></p>  <p>Future perspective:</p> <p>The lighting situation at the Donauwiese has improved noticeably.</p> <p>Valid data on the noise situation at the Donauwiese are available.</p> <p>A solution was developed for virtual escort of people in the "Parkhaus am Bahnhof", which is frequently used.</p> <p>A solution was developed to protect the employees of the parking garage during their rounds.</p>
<p><b>Link to ambition statement</b></p>  <p>De-escalate critical social and frightening hotspots with the help of lighting- and sensor-based technology</p>	<p><b>Risks and mitigation</b></p>  <p>Capacity constraints (contributors, funding) and acceptancy constraints</p> <p>-&gt; keep the topic going with regular meetings of the contributors and guided discussions with citizens, organise funding</p>	<p><b>City performance outcomes and impacts</b></p>  <p>Future perspective:</p> <p>Citizens' sense of security and the security situation on-site has increased significantly as a result of the projects.</p> <p>GDPR-compliant and IT-secure solutions were developed.</p> <p>Competence building of city and stakeholders on smart security issues related to car parks.</p> <p>Visibility of technological advantages to citizens has been increased and concerns decreased.</p>
<p><b>Expected impact and timing</b></p>  <p>Crime hotspot mitigation: The implementation should be carried out until May 2023</p> <p>Smart parking: The implementation phase is planned to start in Q1/2022 and is expected to be completed in June 2024.</p>		

# High level implementation roadmap for solution

## 3) Digitalization of Public Services



# 1 Initiative charter 3) Digitalization of Public Services

Strategy	Stakeholders involved	Inputs, outputs, outcomes and impacts
<p><b>Description</b></p>  <p>What: digital mentors, communication of public services</p> <p>Why: enable citizens to access digital services and integrate digitalization for their own benefit in their daily life</p> <p>How: volunteer digital mentors are being acquired and trained to support citizens in using digital applications, communication campaigns on the existence and use of public services, such as info screens</p>	<p><b>Solution lead:</b> Digital agenda office at city administration</p>  <p><b>Solution working team:</b> Digital agenda office at city administration and Central public relations department</p> 	<p><b>Source of funding and estimated cost</b></p> <p>Digital mentors: Most of the work is done voluntarily. Resources are needed to coordinate training &amp; deployment (approx. 50.000 EUR p.a.)</p> <p>Communication of public services: public funding with co-financing (Smart City project Federal Ministry of the Interior, Building and Community), internal staff</p> 
<p><b>Link to vision</b></p>  <p>Transformation City, Resilient City</p>	<p><b>Contributors:</b> Training institute at university (ZAWiW), civic centers in the districts, further initiatives (generation meeting point, "youth active" etc.)</p> 	<p><b>Solution maturity outputs</b></p> <p>Not applicable. yet</p> 
<p><b>Link to ambition statement</b></p>  <p>Adaptation of ambition statement New: Provide access to, knowledge and trust in public digital services</p>	<p><b>Risks and mitigation</b></p>  <p>Digital mentors: Responsibility for volunteers' training and organization of consultation offer in the long-run</p>	<p><b>City performance outcomes and impacts</b></p> <p>Digital mentors: pool of 20 – 30 volunteers</p> <p>Future perspective: Several local contact points for citizens to make use of consultation offer</p> 
<p><b>Expected impact and timing</b></p>  <p>Constant further development of training digital mentors' activities and materials, thus ensuring quality and transfer to other contexts/places</p> <p>Increased no. of citizens that know and use digital public services, example info screens: concept in 2021   implementation planned for Q2 2022</p>	<p>Communication of public services: communication activities might not reach all different social levels, responsibility issues (decentral content writing)</p>	<p>Editorial concept for urban info screens, incl. templates, picture messages, agreement among departments.</p>

### 3 Key Performance Indicators

Solution	Activities – Inputs and actions	Solution Maturity - outputs	City performance – outcomes & impacts
1 Open Government	<ul style="list-style-type: none"> <li>Existing experiences &amp; knowledge</li> <li>1 citizens lab (bigger event) and 2 citizen dialogues</li> <li>1 generic data ethics concept in German and English</li> </ul>	<ul style="list-style-type: none"> <li>Transparency of processes, e.g., during participation process</li> <li>Perspectives &amp; needs of citizens as drivers for smart city activities</li> <li>Formats and concept for later re-use or transfer to other cities</li> </ul>	<ul style="list-style-type: none"> <li>Informed society</li> <li>Reduced concerns about digitalization</li> <li>Citizens feeling addressed with digital measures</li> </ul>
2 Smart Security	<ul style="list-style-type: none"> <li>Both projects were presented to the public and received clear approval</li> <li>Citizen participation was carried out for all important topics</li> <li>All measures were discussed and clarified with the technical contacts before being incorporated into the concept</li> </ul>	<ul style="list-style-type: none"> <li>The lighting situation at the Donauwiese has improved noticeably</li> <li>Valid data on the noise situation at the “Donauwiese” are available</li> <li>A solution was developed for virtual escort of people in the “Parkhaus am Bahnhof”, which is frequently used.</li> <li>A solution was developed to protect the employees of the parking garage during their rounds</li> </ul>	<ul style="list-style-type: none"> <li>Citizens' sense of security has increased significantly as a result of the projects</li> <li>The security situation on-site has improved noticeably as a result of the projects</li> <li>GDPR-compliant and IT-secure solutions were developed</li> <li>Competence building of city and stakeholders on smart security issues related to car parks</li> <li>Visibility of technological advantages to citizens has been increased and concerns decreased</li> </ul>
3 Digitalization Public Services	<ul style="list-style-type: none"> <li>Existing experiences &amp; knowledge from previous citizen participation activities</li> <li>PR to acquire volunteers and inform about consultation offer</li> <li>Training (structures, material, trainers) of digital mentors for several, regular basic &amp; advanced trainings</li> <li>Creation of editorial concept for city infoscreens to promote digital services and smart city topics</li> </ul>	<ul style="list-style-type: none"> <li>Pool of volunteers</li> <li>Several local contact points for citizens to make use of consultation offer</li> <li>Update and creation of digital public services, considering a wider range of offers also for the city’s associated companies</li> <li>Editorial concept for urban info screens, incl. templates, picture messages, agreement among departments</li> </ul>	<ul style="list-style-type: none"> <li>Informed society</li> <li>Citizens feeling capable of using digital applications</li> <li>Citizens feel addressed with digital measures</li> <li>Accessible (online) offers 24/7, also in times of crisis</li> <li>Increased use of digital, public services triggers further maturity of these services</li> </ul>

# Key Performance indicators - Cross cutting indicators

## Cross cutting indicators

The data ethics concept of the city of Ulm was fully considered.

All smart security solutions were developed with the close involvement of the citizens of Ulm.

All activities work towards open source as a common goal.

## Rationale to KPI approach

The KPI discussion was aligned to the KPI approach of the cities' evaluation concept described in the smart city strategy. It followed the goals of being comprehensible for citizens. For this reason, the city of Ulm chooses a three-stage procedure, which combines key figures at the project level with the Ulm vision and the strategic goals.

The three-stage model consists of the project monitoring (inputs and outputs), the evaluation level (outcomes and impact) and a complementary public, strategic presentation of results.

# Governance structure for roadmap implementation





# City strategy: context factors

The programme progress and experience were negatively affected by both, internal and external, context factors



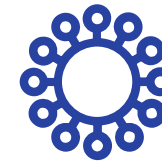
## Capacity constraints

Ongoing capacity constraints in the public administration of Ulm rendered the timely mastering of transformative challenges more complex



## Reprioritization activities

During German Federal elections in Autumn 2021, some initiatives were re-evaluated and consequentially re-prioritised.



## Covid-19 consequences

The Covid-19 pandemic imposed challenges on the city administration, instantly shifting to a remote work mode to continue citizen service provision



The enforced short-term re-planning, uncertainty and capacity constraints hindered the programme's progress and experience

Intelligent Cities  
Challenge

Section

3+4

# City of Ulm: Impact

ICC Transformation

June 2021 to August 2022



# Impact executive summary

In terms of the first solution, Open Government, the city dedicated personnel resources to this topic with one full time member of staff working on the planning and implementation of the open government approach, that includes the promotion of transparency, cooperation, participation and the ambition to learn as a city together with all stakeholders, in particular citizens. With the implemented participation activities, such as exhibitions, citizen labs, enhancing citizen science initiatives and different other forms of dialogue, the city not only delivered information on its smart city path, but also made it tangible and concrete by organising platforms for exchange with citizens. An online participation platform is already in place and has been used, whereas citizen participation is expected to increase with a new platform envisaged for the end of 2022. As for the open data platform, an extension for an easy visual access and a higher number of use cases is envisaged for 2023.

As regards the action on Smart Security, the first phase of planning and visualisation has been successfully implemented in terms of identification of scare areas and the development of 3D-simulation (virtual world) to showcase different lighting concepts for different settings/use cases. Unfortunately, there was no pilot operation in summer 2022 as envisaged due to funding obstacles. The topic of smart security continuous to be part of the agenda.

With regards to the Digitalization of public services, the number of people reached by digital mentors (volunteers ) increased compared to 2021. Now 25 volunteers at 4 premises in different Ulm districts offer consultations once a week, a fifth meeting point is planned together with an increase in the number of trainings of volunteer mentors. A higher number of online services/forms are available in a shared manner either provided by the city administration or the Federal State of Baden-Württemberg platform. The efforts of communicating these opportunities have been raised and tools have been used to self-assess the city on smart services, devices. With a federal law (OZG) the government has set the legal framework on online access to municipal services German municipalities have to comply to. This framework also guides the efforts of the city of Ulm.

# Assessment of city performance - discussion

## 1) Open Government

direct citizen participation, data hub and data ethics concept

- During Covid: informative character of citizen events -> changed to giving citizens a sense of ownership
- Uptake of citizen science approach
- Administration not quite sure how to read to citizen feedback
- Change of funding source for data hub + change of ministerial responsibility -> delay in being launched
- Three different data portals: issue of decentralised approach / static data
- Open data approach has been followed consistently (Github, etc.)
- Municipal Open Government concept has been developed

## 2) Smart Security

smart crime hotspot mitigation, smart parking garages

- First phase of planning and visualisation has been successful for the initiative Smart Crime Hotspot Mitigation: identification of scare areas, development of 3D-simulation (virtual world) to showcase different lighting concepts for different settings/use cases

## 3) Digitalization of Public Services

digital mentors, communication of public services

- Increased number of people reached by digital mentors: 25 volunteers engaged as digital mentors at 4 premises in different Ulm districts, consultations once a week, 1-4 participants, 3 basic and 10 advanced trainings for mentors since 04/21
- Increased no. of services available online, but decentralized by city administration and federal state platform
- Work towards a more user-centred design
- Increased number of target groups
- Increased personnel to communicate existing services and transformation of the city
- Bitkom (= German digital association) rating as self-reflection tool

# Assessment of solution maturity - discussion

## 1) Open Government

direct citizen participation, data hub and data ethics concept

- Approach for increased transparency and participation with 1 staff member only responsible for this topic + municipal open government concept
- Online participation platform in place, but with informative character -> change of platform envisaged for end of 2022
- Open data platform: bug fixing until 06/22 -> visualisation envisaged for 2023, increase in new datasets and use cases necessary
- Several attempts to break data ethics concept down to practice: consult other cities, identify EU programmes to integrate the concept and elaborate on it with use cases

## 2) Smart Security

smart crime hotspot mitigation, smart parking garages

- Initiative Smart Crime Hotspot Mitigation ended at conceptual stage -> no implementation due to lack of funding and stakeholder support
- Initiative of smart security for parking garages could not be implemented so far due to rejection of Ministry -> rejection due to particular regulations (state aid examination). The topic will be reviewed during the next round of ideas submission phase.

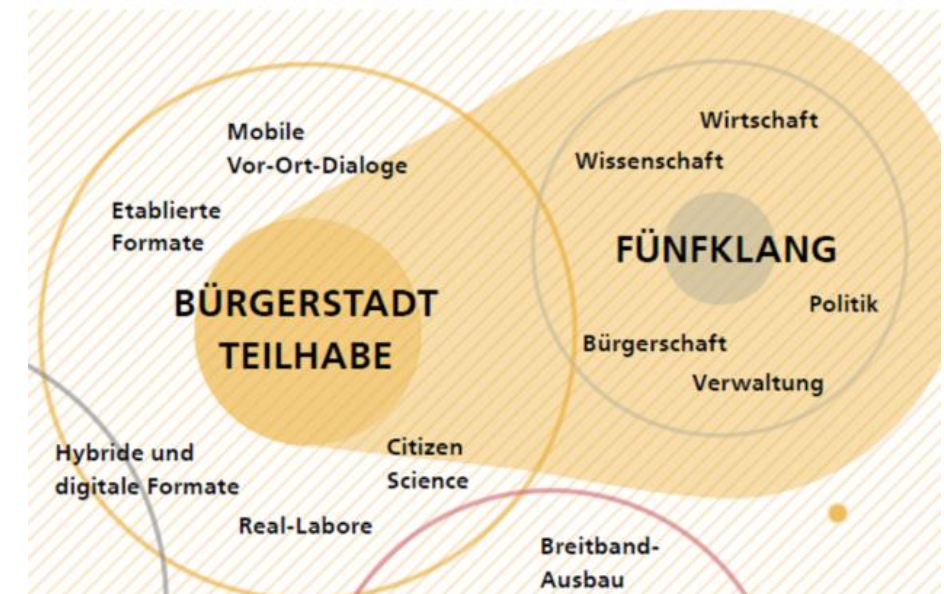
## 3) Digitalization of Public Services

digital mentors, communication of public services

- Digital mentors:
  - one more location offering mentoring services planned additionally to 4 existing ones
  - 2 digital mentors offering TtT trainings (exploiting knowledge of the mentor group)
  - network-based organization: knowledge of mentors is circulating in the volunteers group
  - protocols on how services were delivered will be evaluated and used for improvement
- External push helpful to speed up processes (refers to [Bitkom](#) ranking of German Smart Cities, Bitkom = digital association)

# Assessment of city ecosystem and activities - discussion

- capitalising on well-established structures of the city's ecosystem building on prior cooperation -> easy cooperation
- ecosystem is one of the core qualities and a necessity in the city
- the same stakeholders remained continuously engaged in the Intelligent Cities Challenge from beginning to the end
- benefits from diversity of ecosystem (small & medium sized enterprises, regional universities, colleagues in municipal departments, civil society institutions)
- intensified representation of businesses to be considered, depending on different solutions
- focus on citizens as the core of the ecosystem was actively enforced; the aim is to continue and enhance a user-centric approach throughout the next smart city implementation phase



# 6 key lessons

Lesson	Reflections
1	Getting the buy in from various stakeholders, in particular from citizens is a constant challenge. Communication and relationship building is key.
2	Persons implementing the project in terms of competences, drive and commitment have a significant influence on the success of the project. So do heterogeneous project teams that can bring in different types of knowledge.
3	Building up in-house competences in city administrations, e.g. through exchange and further training, is sometimes underestimated. At the same time, change processes and building the right competence foundation takes time.
4	It is important to take into consideration governance issues more strongly (responsibilities, dovetailing of existing urban concepts) and treat data as a foundation: open data, data security, data management, etc.
5	The ICC provided an added value to Ulm in terms of presenting Ulm as a Smart City and City of the future in line with ongoing and funded activities in the city; providing the city with an opportunity to reflect on what is going well and where there are points for improvement as well as exchanging and learning.
6	Cities' struggle to find the right people for job vacancies related to smart city skill & competence requirements.

## Reflections on city collaborations

The occasions of concretely working with other cities during the ICC were rare.

However, Ulm benefitted from the ICC cities' profiles that were used to identify other cities deploying solutions based on a similar infrastructure, such as LoRaWAN. In particular, we followed the approach of Terrassa as presented at the Smart City Expo in 2021.

Ulm could also capitalise on the peer-review sessions organized as part of the ICC city labs. Here, we identified potential knowledge carriers approachable for future collaboration projects, e.g., the City of Cork, that also worked on solutions in the context of an aging population.

During the ICC, we formed an informal group with some of the ICC cities, such as Arad, Gliwice, Bistrita and Las Rozas with the aim of exploring intersections and common needs that could be answered in a collaborative approach. The groups aims to facilitate peer learning and match needs in terms of a citizen-centred smart city development with financing opportunities.



# 10 Initiatives with implementation start in 2022 (within the scope of the Smart City Model Projects' Funding)

1. Talking Trees



2. Visitor guidance system



3. Wengen & Poets' Quarter – Smart Green



4. Co-Learning-Spaces & Fake News



5. Car park of the future?



6. New vision of neighbourhoods



7. GetMy WallboxNOW



8. Sensor data management of the inner-city special parking area



9. Infrastructure projects

9a. Participation platform

9b. Data hub (further development and visualization)

# Commitments

## Commitments to ongoing resources

- Team of 5 to 6 full-time members of staff completing the smart city department at the municipality of Ulm
- National co-funding for a first tranche of 10 smart city initiatives over the next 2-3 years, another tranche until end of 2026
- Personnel resources committed for the internal digitalization of the municipality of Ulm, in parallel to external smart city activities
- Pointing out continuation of smart city initiatives after co-funding period, considering business and operating models from the very beginning
- Establish and enlarge the role of smart city department towards a support centre for implementation partners

## Commitments to ongoing collaboration

- Further continuation of informal group meetings with some of the ICC cities, such as Arad, Gliwice, Bistrita, Cascais, Alcoy and Las Rozas with the aim of exploring intersections and common needs that could be answered in a collaborative approach.
- Intensifying the exchange and collaboration with the business sector (start-ups, enterprises, business associations etc.)
- Collaboration as structural element in all smart city solutions due to bilateral implementation made of city administration and local stakeholder (be it the university, another city department, etc.)

## 3 Year plan - ambitions

**Building on the ICC, what will the city aim to achieve in 3 years' time?**

- Implementation and anchorage of the smart city initiatives
- Increased identification of citizens with the smart city concept underpinning an open, sustainable, inclusive and clever approach
- Focusing on small but sustainable steps, emphasizing the strengths of close corporation and collaboration of stakeholders

**What steps will you take over the next 3 years to achieve these goals?**

- Further implementation and monitoring of smart city solutions
- Kicking off the next tranche of smart city initiatives within the federal co-funding program "Model Projects Smart Cities" (under the responsibility of the Federal Ministry of Housing, Urban Development and Construction - BMWWSB)
- Review of smart city strategy
- Applying the communication and open government strategy