



# Accessing European cities with a Citizen Card

Different cities, different needs

## About this study

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### About Eurocities:

Eurocities is the network of 198 cities in 39 countries, representing 130 million people, working together to ensure a good quality of life for all people. Through joint work, knowledge-sharing and coordinated Europe-wide activity, the network ensures that cities and people are heard in Europe.

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## Executive Summary

Cities play a key role in providing products, services and support to its citizens and visitors with the goal to build modern, sustainable places and communities that are accessible for all. New, intelligent urban planning should be developed that creates safe, affordable and resilient cities with green, healthy and culturally inspiring living conditions. Citizens play an important role together with governments, companies, NGOs and researchers in creating social, technological and political innovations for achieving sustainability targets. Citizen Cards can help reach sustainability in cities and communities.

*“The citizen card is a multi service card that enables citizens to use digital services in cities. It connects actors in the city ecosystem and provides citizens with access to products and services that can improve their everyday lives.”*

The cities of Gijon, Rotterdam and Zaragoza are great examples of cities where Citizen Cards are used successfully. Many citizens use these cards daily to access a variety of services. From using public transport to visiting a zoo, the local library or accessing social benefits. It offers people the possibility to access public services where and when they want.

The Eurocities Knowledge Society Forum has initiated this Citizen Card project with the goal of creating a ‘white label’ Citizen Card for European cities so that citizens can access services and products in each European city using the same Citizen Card.

Imagine being a citizen of Gijon and using your local Citizen Card in Rotterdam to visit the Euromast, to use public transport in Pau or to admire the National Sculpture Museum in Valladolid. It might sound like a dream, but with combined efforts and a clear vision, it is possible to offer current and future generations a hassle-free, safe, secure and convenient solution to roam between European cities with only a smart card or app in the palm of your hand.

This report provides a number of basic building blocks, processes and methodologies to introduce a Citizen Card in a city. It is a first step in developing a white label Citizen Card. By creating a network of Citizen Card cities to share experiences and services, citizens from the connected cities can actually enjoy other European cities by using one simple solution.

The aim is to further develop the white label Citizen Card together with interested cities and the Living in EU<sup>1</sup> (Living-in.EU) initiative and to create interoperable technological underpinnings in the form of Minimal Interoperability Mechanisms (MIMs)<sup>2</sup>. Part of shaping the way forward is creating a shared strategy to raise funding to provide European citizens across participating cities with a cross-border Citizen Card solution.

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<sup>1</sup> <https://www.living-in.eu/>

<sup>2</sup> <https://oascities.org/minimal-interoperability-mechanisms/>

# Key findings

## 1. Ensuring a citizen-centric approach

Cities that have successfully deployed a Citizen Card – like Gijon, Rotterdam and Zaragoza – all have one thing in common. By simply assessing the needs and wants of citizens and determining the most accessed and used public services, they were able to offer the right products and services. Citizens must be included in the development of a Citizen Card and its services and products. Solutions should be based on actual citizen needs, and build upon data sovereignty and privacy by design with citizen consent as the primary validation in every process.

## 2. Relating Citizen Card goals to the priorities of the city and its political leaders

Politicians, decision and policy makers are key to getting the commitment and support needed to either introduce or upgrade a Citizen Card. The Citizen Card goals should always be connected to the priorities of the city and/or its ecosystem. Which problems can a Citizen Card solve? And how are services and products included in such a way that guarantees a bigger impact compared to the ‘regular’ public service channels and offerings?

## 3. Actively reach out to partners in the city ecosystem

If you want to successfully introduce a Citizen Card, it is crucial to involve all partners in the city ecosystem, from city departments to citizen representative groups and from knowledge institutions to companies. By collaborating with these partners, you can speed up the uptake of the solution, expand its reach or add new services or products.

## 4. Promoting an open, interoperable, safe and secure digital infrastructure

As new technology keeps developing and emerging, it is important to create an infrastructure that is sustainable, affordable, and flexible. Creating a technology agnostic digital infrastructure for the Citizen Card is a basic requirement to prevent vendor lock-ins and the need to rely on ‘legacy’ systems. Availability, integrity, security, safety, and data sovereignty of systems in compliance with EU-regulations, standards, and specifications are all essential to success.

## 5. Embracing European regulations, standards and specifications

European regulations, standards, and specifications should come first to be compliant at local, regional, national and European level. The most pragmatic approach is working on existing specifications that comply with European regulations, determining minimal requirements and principles, and applying these in the local context. An example of such an approach has been introduced with the MIMs plus developed in the framework of Living-in.EU<sup>3</sup>.

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<sup>3</sup> <https://www.living-in.eu/sites/default/files/files/MIMs%20Plus-LI.EU-Tech-Specs%20v3.0.docx.pdf>

# 1. Setting the scene

As the world is changing, Europe is redefining its role on the global stage. It is setting the scene for the next decade and embracing digital as the new normal. More than ever, politicians and civil servants seem aware of the opportunities and challenges that emerging technologies bring and what kind of impact they have on society. To meet the challenges with appropriate solutions, cities need to start redesigning their public services, their relations with the private sector, knowledge institutes and the way they communicate and interact with citizens. One example is the increasing demand of citizens to be able to access services where they want and whenever they want, under the condition of not having to share too much data, pay extensive fees, encounter bureaucracy or give up their privacy. People are used to ordering products and services online, making direct payments and accessing all kinds of services in the blink of an eye. All in a convenient, safe and secure way. So why can't they have the same kind of experience when interacting with governments, cities, and communities?

Cities are the places where the effects of global challenges impact people more directly. They are where solutions to those challenges are first developed and implemented. Digital solutions, powered by data produced in our cities, are key to solving many of the most urgent urban challenges including sustainable urban mobility, energy efficiency, holistic (smart and sustainable) urban development and reducing the digital divide whilst providing societal benefits with a sustainable, yet justified business model for all parties involved.

For over a decade, several smart and sustainable solutions have been developed and tested in our cities. However, limited resources, legal and governmental barriers, technological skills shortage, lack of common methodology and innovation potential prevent or hinder the large upscale and uptake of those solutions. This prevents governments benefitting from more innovative, high-quality, cost-effective processes, services and products. More importantly, it prevents citizens from receiving the services, products and support that are needed to enhance the quality of their daily lives. The Eurocities Citizen Card is the result of two initiatives that aim to address the changing reality and to seize the opportunities illustrated above.

To support the digital transformation of European cities and communities, Eurocities is partnering with the European Commission, member states, the European Committee of the Regions (CoR), Open and Agile Smart Cities (OASC), the European Network of Living Labs (ENoLL) and supporting networks such as the Cooperation Agency of the Association of Netherlands Municipalities (VNG) to realise the commitments of the 'Join, Boost, Sustain initiative' of Living-in.EU. Building on a joint political declaration, it is a first step towards shaping a European approach for digital transformation that puts cities and citizens at the centre. The Citizen Card provides a tangible blueprint for cities to implement and scale a digital solution in their own local context while ensuring a European approach.

Eurocities' Knowledge Society Forum (KSF) LAB provides Eurocities members with a way to work towards tangible results around digital and smart cities. It aims to be an incubator for good practices and proven solutions, seeking to develop universal prototypes and Minimal Viable Products (MVPs) based on existing solutions in collaboration with cities and their communities. It serves as a hub where the needs of citizens are matched with modern technology, agile approaches, and tangible deliverables which are purpose-based and value-driven.

By working together to jointly tackle common challenges members will:

- **Become leaders in meaningful technology;** the LAB links the strengths of cities and networks to the strategic ambition of the EU to become a front runner in innovative solutions based on sustainable, justified business models for urban challenges and collaboration.

- **Create impact through scaling-up;** the LAB supports the scale-up of proven solutions by scouting, developing and sharing existing and newly integrated (technology) solutions for our cities. It creates sustainable impact through meaningful innovations that are validated by citizens and supported by public-private coalitions.
- **Co-create new ideas and shared solutions;** the LAB uses close collaboration and promotes inclusive development to spur sustainable solutions that add value for citizens, governments and private sector organisations.
- **Safeguard the public interest;** the LAB develops, promotes, and monitors the social and ethical requirements for (technology) solutions and emphasises compliance, openness and interoperability in line with existing EU-regulations and frameworks.
- **Introduce sustainable value models;** the LAB connects ecosystem stakeholders to create an advantage through integrated (technology) solutions, and fosters openness to balance intellectual property, transparency and interoperability of systems and applications, creating new business models for the public and private sectors.

Impact is at the core of the KSF LAB, and through the joint development of the Citizen Card deliverable as well as actively making it available to other cities, the LAB supports the implementation and scaling-up of new digital solutions in cities available to citizens.

## 2. The Citizen Card

The Eurocities Knowledge Society Forum (KSF) LAB has selected the Citizen Card as its first project. It is aimed at upgrading and scaling up the Citizen Card model from Gijon and Zaragoza as an instrument for cities to provide inclusive digital solutions to their citizens. The card can be a physical product (smart card) supported by digital instruments or an app (fully digital) or vice versa. Every citizen has one card/app, which enables cities to customize their local identity and services in a safe, secure and convenient way. The card is a scalable solution that allows cities and businesses to add extra services to the 'platform'.

The introduction of a white label Citizen Card, its accompanying platform and services, will have an impact on citizens and city visitors. It also enables a sustainable business model for the entire city ecosystem. Citizens can access all the products and services they need while being in full control over their (personal) data: an app or a smart card. By introducing a Citizen Card, cities can:

- Act as an enabler to implement different policies (mobility, social benefits, culture, city promotion, etc.).
- Reduce costs (reuse of data, one access point, fully digital processes and a single, integrated solution that can be implemented and scaled by all European cities).
- Reduce bureaucracy (digitised processes and personal service based on your needs).
- Increase convenience (access to products and services when and where you want with one solution).
- Increase compliancy (privacy by design, data sovereignty and consent are at the heart of the solution).
- Increase security (data is not stored in several databases; a trusted digital identity is in place and data sharing is based on a decentralized approach).
- Increase sustainable interaction with citizens, public services, and justified business models.

The experience of Gijon and Zaragoza show that when citizens and visitors (including tourists) use these cards on a daily basis, the level of trust in the system is high. Besides the increased trust, citizens are more proactive in communicating and interacting with cities by sharing their needs and asking for specific products and services to be added to the 'platform'.

Every city has its own characteristics and needs. Therefore, every Citizen Card is unique. However, most principles and requirements (e.g., technical specifications, legal requirements) are common and should be followed to implement a Citizen Card in any city in Europe. This way, cities are compliant with the European standards, specifications, rules and regulations, such as the Minimal Interoperability Mechanisms Plus (MIMs) and the European Interoperability Framework (EIF)<sup>4</sup>.

Based on the expertise and experiences of all participating cities, the project members have discovered and defined a phased blueprint for cities to come to a customized Citizen Card. As innovation and technology developments continuously advance, cooperation with SMEs, companies, academia and other experts from different local ecosystems becomes fundamental for the success of this project towards the future.

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<sup>4</sup> [https://ec.europa.eu/isa2/eif\\_en](https://ec.europa.eu/isa2/eif_en)



## 2.1 The objective of the project

The objective of the project is to develop and design a white label Citizen Card process based on the model of Zaragoza and Gijon. This document provides process steps and methodologies that support the successful implementation of a Citizen Card. Further collaboration on the Citizen Card is envisioned as an Icon project through Living-in.EU, to solidify the insights in this report into general mechanisms for cities that stay aligned with existing standards, regulations and policy.

The white label has been created in collaboration with the following cities:

1. Bratislava - Slovakia
2. Eindhoven - The Netherlands
3. Gijon (mentor city) - Spain
4. Pau - France
5. Porto - Portugal
6. Rotterdam - The Netherlands
7. Valladolid - Spain
8. Zaragoza (mentor city) - Spain

The final goal of the Citizen Card project – as a KSF LAB project – is implementation in cities. However, the Covid-19 pandemic has seriously impacted local governments agendas and related budgets, making city administrations re-think and re-plan activities. As a result, the current short-term goal is to produce together a deliverable which is applicable but does not need to be implemented as part of the pilot project itself. Following the delivery of this report, activities are aimed at developing a coalition of the willing and securing funding to continue the Citizen Card project: translating the provided insights into technical specifications, developing sustainable business models and rolling-out local implementations of white label Citizen Cards. Next steps are addressed in more detail in the last section of this report.

## 2.2 An inclusive approach – Different cities, different needs

In Europe, many member states have different backgrounds and even cities within a member state have their own culture, habits, and requirements. Before creating the white label Citizen Card, it is important to understand that, from a technological perspective, a ‘one size fits all’-solution to service these varieties is doomed to fail. The strength of – for example – the eIDAS<sup>5</sup> and GDPR<sup>6</sup> regulation, is that they provide frameworks without prescribing what technology needs to be used.

Additionally, the cities involved in this project are all at a different stage of development of a Citizen Card. Some have had such a card for decades while others have just started thinking about creating and implementing a solution for their citizens. What all cities have in common however, is that the perception of the Citizen Card as a public-driven movement to support citizens in a convenient, safe, and secure way.

To ensure this report is interesting for all Eurocities member cities, it includes three types of cities in this project, which are:

1. **City A:** “I’m thinking about launching a Citizen Card in my city” – Bratislava
2. **City B:** “I have a Citizen Card in my city, but I would like to create more impact to solve our city challenges” – Eindhoven, Gijon, Rotterdam and Zaragoza

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<sup>5</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32014R0910&qid=1614605035560>

<sup>6</sup> <https://eur-lex.europa.eu/eli/reg/2016/679/oj>

3. **City C:** “I don’t have a Citizen Card yet, but I’m planning a short-term launch” – Pau, Porto and Valladolid

## 2.3 From project to shared purpose

During the execution of this project, it became clear that participating cities wanted to achieve more than just the creation of a white label Citizen Card. The shared conviction is that a Citizen Card can play a role in the green, social and digital transformation of European cities, leading to healthy urbanisation. The project has evolved into a shared purpose and this report marks the start of a longer journey in which cities want to collaborate and create value for their citizens. Attached to the report is a dedicated Annex ‘Funding our Future’ on the European context and funding possibilities for the participating and interested cities to move onwards from the beginning of 2021.

## 3. Building a white label Citizen Card

Several methods were used to gather information from the involved cities and other relevant projects in Europe, like CARD4ALL<sup>7</sup>. One-to-one interviews were conducted with the participating cities, questionnaires per building block of the white label Citizen Card were created, and the project hosted several virtual work sessions while limiting the time needed from cities and its representatives. After these sessions it was concluded that the participating cities wanted to develop a next generation Citizen Card loosely based on existing city cards in Europe, embracing new technologies, ways of thinking and acting. A card that is based on a sustainable and justified business model, as well as being scalable and interoperable. This solution is a ‘white label’ Citizen Card. This chapter describes the phases for a city to develop a Citizen Card while remaining compliant with current European regulations and directives.

### 3.1 Phases of development

Never has urban development been as complex as today. Cities are asked to shape their digital transformation and innovations to help create smart cities. Through living lab methodologies, stakeholders are involved in the design of processes and services, placing the end users at the centre of development towards the future. Seven phases are defined below to support the development and design of a Citizen Card in a city. These phases can be applied by those responsible for the development and implementation of a Citizen Card.

**Table 1 – Phases of development**

Phases	Steps	Resources
<b>Phase 1 – Assessing the current status and enabling environment</b>	<ul style="list-style-type: none"> <li>Assessing the needs of citizens.</li> <li>Conduct an inventory of the most used public services.</li> <li>Conduct a survey to gather citizen’s needs in relation to public services.</li> <li>Conduct an inventory of existing software applications, ICT systems.</li> <li>and other tools to better understand the requirements for the introduction of a Citizen Card.</li> </ul>	<ul style="list-style-type: none"> <li>Public service Mapping.</li> <li>Citizen Card Survey.</li> <li>Digital Readiness Assessment.</li> </ul>
<b>Phase 2 – Establishing a shared understanding and strategic planning</b>	<ul style="list-style-type: none"> <li>Develop a Citizen Card strategy outlining overarching needs, desired activities and outcomes.</li> </ul>	<ul style="list-style-type: none"> <li>Citizen Card Strategy and roadmap.</li> <li>Technology and data strategy.</li> </ul>

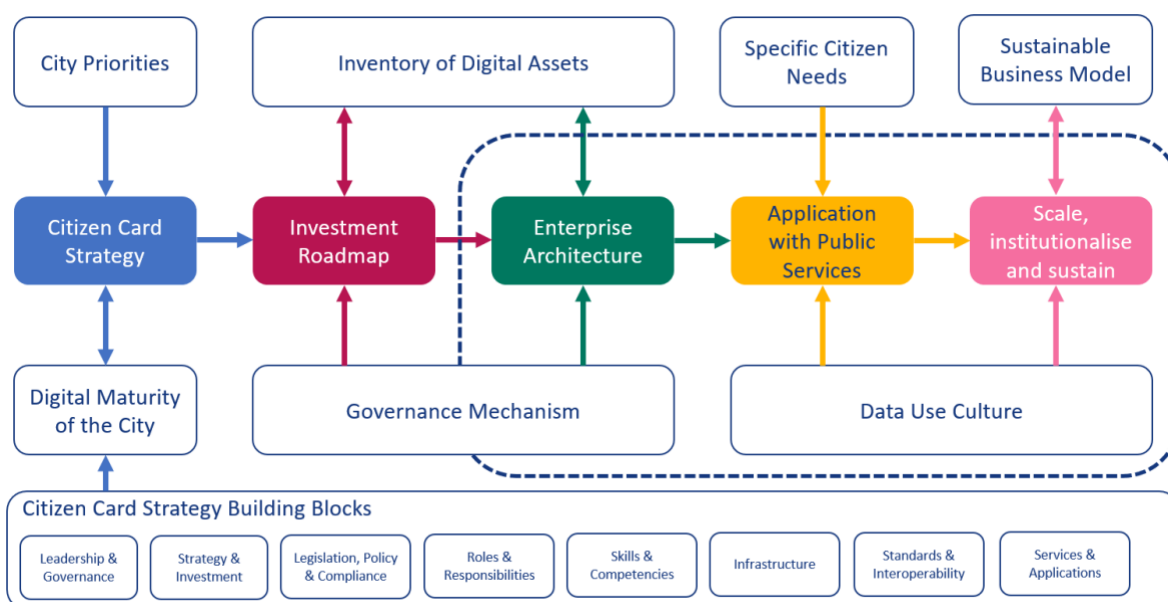
<sup>7</sup> <https://urbact.eu/card4all>

	<ul style="list-style-type: none"> <li>Define a vision for how the Citizen Card system will be strengthened through the use of technology and data.</li> </ul>	
<b>Phase 3 – Planning the enterprise architecture</b>	<ul style="list-style-type: none"> <li>Review the current state and develop an architecture blueprint for the design of the Citizen Card implementations.</li> <li>Identify open standards to ensure data exchange, systems integration and future proofing of Citizen Card implementations.</li> </ul>	<ul style="list-style-type: none"> <li>Reference Citizen Card Architecture.</li> <li>Standards and Regulations Handbook.</li> </ul>
<b>Phase 4 – Determining Citizen Card requirements</b>	<ul style="list-style-type: none"> <li>Identify Citizen Card content appropriate for the implementation context.</li> <li>Ensure the use of content aligned with identified standards for the future state.</li> </ul>	<ul style="list-style-type: none"> <li>User, technical and functional requirements (including e.g. security, privacy, availability, integrity and data sovereignty).</li> <li>Key Performance Indicators.</li> </ul>
<b>Phase 5 – Defining the future state</b>	<ul style="list-style-type: none"> <li>Formulate a Citizen Card investment roadmap to support the strategy.</li> <li>Plan and identify appropriate digital interventions, alongside the Citizen Card and data content, to improve the Citizen Card system processes and address programmatic needs.</li> </ul>	<ul style="list-style-type: none"> <li>Investment Roadmap.</li> <li>Service Design Approach.</li> </ul>
<b>Phase 6 – Implementing, maintaining and scaling</b>	<ul style="list-style-type: none"> <li>Maintain and sustain digital Citizen Card service implementations.</li> <li>Identify risks and appropriate mitigations.</li> <li>Add Citizen Card services based on the needs of citizens.</li> </ul>	<ul style="list-style-type: none"> <li>Digital Citizen Card Maturity Assessment (including determining the role(s) of the urban authority – coordinator, facilitator, partner or financier)</li> <li>Risk Management Strategy</li> <li>Quintuple helix model for scaling</li> </ul>
<b>Phase 7 – Monitoring and evaluating Citizen Card implementation</b>	<ul style="list-style-type: none"> <li>Monitor your implementation to ensure digital</li> </ul>	<ul style="list-style-type: none"> <li>Citizen Card Dashboard (data-driven development based on real-time insights).</li> </ul>

<b>and fostering data use</b>	<p>implementations are functioning as intended and is having the desired effect.</p> <ul style="list-style-type: none"> <li>Foster data-driven adaptive change management within the overall Citizen Card system.</li> </ul>	<ul style="list-style-type: none"> <li>Data-driven Change Management Methodology.</li> </ul>
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### 3.2 Citizen Card process overview

The development of a Citizen Card ecosystem is a dynamic process and depends on your city's context, needs, and constraints. We created a generic Citizen Card process overview to support cities in their Citizen Card journey, as shown below.



**Figure 1 - Citizen Card process overview**

This process can be expanded using on the roles and entities mentioned in the quintuple helix approach, with citizens and the private sector being the most obvious inclusions.

### 3.3 The Citizen Card Approach – 9 considerations

This report has been developed to accommodate different approaches for planning Citizen Card developments. When developing a Citizen Card, the steps as outlined in the table below should be considered. They provide an extensive overview of considerations for preparing, implementing and monitoring a citizen card implementation and they form the heart of this report. The steps and related considerations are addressed in more detail with supporting examples in the sections 3.3.1 - 3.3.9.

**Table 2 – Citizen Card considerations**

Steps	Inputs	Outputs
1. Define the goals and strategy	<ul style="list-style-type: none"> <li>Political/city priorities.</li> <li>Citizens needs based on an assessment.</li> </ul>	<ul style="list-style-type: none"> <li>Political commitment.</li> <li>Sustainable funding.</li> </ul>

	<ul style="list-style-type: none"> <li>City ecosystem needs based on an assessment.</li> </ul>	<ul style="list-style-type: none"> <li>Broad support within the ecosystem.</li> </ul>
2. Form the team and establish pragmatic goals	<ul style="list-style-type: none"> <li>Citizen Card Strategy.</li> <li>Citizen Card Objectives.</li> <li>Organigram Citizen Card Organisation.</li> </ul>	<ul style="list-style-type: none"> <li>Named team and list of stakeholders.</li> <li>Shared vision on Citizen Card goals in relation to the strategic goals of the city.</li> <li>Citizen Card ecosystem (quintuple helix).</li> </ul>
3. Identify Citizen Card challenges and needs	<ul style="list-style-type: none"> <li>User requirements (functional and non-functional such as data ownership).</li> <li>City priorities.</li> <li>Citizen Card Survey.</li> <li>Digital Readiness Assessment.</li> </ul>	<ul style="list-style-type: none"> <li>Analysis of the Citizen Card processes.</li> <li>Process flows and Customer Journeys.</li> <li>Prioritised pain points and challenges.</li> </ul>
4. Determine appropriate Citizen Card interventions	<ul style="list-style-type: none"> <li>Targeted Citizen Card processes.</li> <li>Current state process flows and Customer Journeys.</li> <li>Prioritised pain points and challenges.</li> </ul>	<ul style="list-style-type: none"> <li>Prioritised Citizen Card interventions.</li> <li>Future state process flows and Customer Journeys.</li> <li>Determined digital landscape and requirements.</li> </ul>
5. Plan the implementation	<ul style="list-style-type: none"> <li>Future state process flows and Customer Journeys.</li> <li>Functional and non-functional requirements (e.g., security, privacy, availability, integrity and data sovereignty).</li> </ul>	<ul style="list-style-type: none"> <li>Implementation plan specifying governance, workforce, regulatory, infrastructure, data, interoperability and standards needs.</li> </ul>
6. Link the Citizen Card implementation to the broader architecture	<ul style="list-style-type: none"> <li>Future state process flows, Citizen Card interventions and requirements.</li> <li>Citizen Card Architecture.</li> </ul>	<ul style="list-style-type: none"> <li>Current and Future State Citizen Card Architecture.</li> <li>Core and enabling components of planned digital investments.</li> <li>Common components for reuse across public</li> </ul>

		services related to the Citizen Card.
7. Develop a budget	<ul style="list-style-type: none"> <li>• Historical budget and costs.</li> <li>• Implementation plan.</li> </ul>	<ul style="list-style-type: none"> <li>• Citizen Card budget defined by phases and cost drivers.</li> <li>• Expected benefits (financial and social value).</li> </ul>
8. Monitor the implementation and use data effectively	<ul style="list-style-type: none"> <li>• Historic or baseline data.</li> </ul>	<ul style="list-style-type: none"> <li>• Logic model for Citizen Card Implementation.</li> <li>• Plan for monitoring and evaluation.</li> <li>• Maturity assessment.</li> </ul>
9. Value proposition and next steps	<ul style="list-style-type: none"> <li>• Outputs from previous steps.</li> </ul>	<ul style="list-style-type: none"> <li>• Team, stakeholders and citizen priorities.</li> <li>• Defined Citizen Card challenges and pain points.</li> <li>• Future state Citizen Card Architecture.</li> <li>• Implementation plan including digital investments and sustainable business model.</li> </ul>

### 3.3.1 Define the goals and strategy

Most cities have long-term goals and a specific strategy to reach those goals. The execution of the strategy depends on the political priorities and citizens needs within a city. A Citizen Card can become a means to reach the set goals by offering products, services and support that are in line with the political priorities and the actual needs of citizens and other stakeholders in the city ecosystem. The introduction and development of a Citizen Card should always have the support of politicians and/or the citizens. Therefore, it is important to conduct research and determine the exact needs of the mentioned stakeholders before introducing the idea of a Citizen Card. The outcome of such research can boost the actual introduction and development of a Citizen Card when the need for such means is clear. Based on such research, politicians can assign city officials to start forming a team to execute the idea.

### 3.3.2 Form the team and establish goals

The second step is to form the Citizen Card team and establish goals for your investments in the project. You will determine team roles and responsibilities and develop a common understanding of Citizen Card's goals. But before you start establishing your team, take these three digital development principles into account:

1. **Understand how your work fits into the global development landscape.**

Identify others working on the same problem close to you and determine if there is a community of practice that relates to your work. Find the technical leaders through virtual networks or communities of practice who can help you disseminate your work to other teams, departments or partners.

2. **Engage diverse experts across disciplines, departments, citizen groups and other quintuple helix entities throughout the project life cycle.**

Create an engagement plan to apply this expertise at all phases and incorporate insights through feedback loops. Look for tools and approaches from other sectors and publish your findings so that they are available to other groups and cities.

3. **Plan to collaborate from the beginning.**

Build collaborative activities into proposals, work plans, budgets and job descriptions. Identify indicators for measuring collaboration in your monitoring and evaluation plan.

Consider what skills, functions and knowledge may help when crafting a comprehensive implementation plan for a funder. Seek out individuals with adequate dedicated time who are qualified, motivated, and knowledgeable in three fields: governance, management, and operations.

### **Governance**

Consult a government oversight mechanism (local governance structure), if one exists, to ensure that the planned investment aligns with other government investments and local priorities in the current or upcoming city plan – or consider forming such a mechanism if one does not exist. This committee can be responsible for providing overarching direction and guidance within the ecosystem of the city. If forming a governance committee, discuss the governance principles and how responsibilities would be shared, even if no formal governance policies exist yet. Identify a senior political and government sponsor to chair the committee who can mobilise resources, align interests, and resolve potential conflicts, as well as a public service lead who is tasked with overseeing the deployment of the Citizen Card. Consider including these people in the governance committee:

- Senior political sponsor(s)
- Senior government sponsor(s)
- Representatives of public service and ICT departments
- Representatives of financial departments
- Technical team leaders/advisors
- Members of citizen representatives' groups
- Members of quintuple helix entities (e.g., businesses, knowledge institutes, academia)

### **Management**

The management team will be responsible for completing the process to develop a Citizen Card implementation plan. This team should expect to devote a substantial level of their daily work time to these tasks. Look for team members who possess a significant number of technical skills; prior experience in managing large implementations is an important asset. Consider including these people on the management team:

- Project/process manager, who takes responsibility for the delivery of this process
- Procurement manager
- Enterprise Architect
- Solution Architect(s)
- Public service Domain specialist(s)
- Change Management Advisor(s)
- Policy Advisor(s)
- Human-centred design advisor(s)



- Monitoring and evaluation analyst

## **Operations**

The operations team, a multi-stakeholder team, works under the guidance of the management team, providing necessary technical expertise. Consider the skills needed to successfully implement the proposed work when selecting operations staff, as they will provide important perspectives on how to build out a viable plan. Team members may have multiple competencies, or you may need more than one person for any one of these fields. Consider including these people as operations support:

- Business analysts (to develop requirements for the digital enterprise, consisting of applications and platform)
- Software developers
- System maintenance, optimisation and end-user support or help desk staff
- Data analysts and scientists
- End-user representatives

Mapping stakeholders with the roles and responsibilities of individuals can help achieve the Citizen Card goal of establishing a successful team. You will draw on various people at different points and identifying expertise from the outset will speed the planning and implementation process.

Once you have formed the operations team, convene with them and, if necessary, stakeholder(s) to articulate a common understanding of the main goals of Citizen Card project and how it aligns with your city's strategy.

### **3.3.3 Identify Citizen Card challenges and needs**

The previous section aligned a team around the primary goals of Citizen Card project and identified the strategies to guide the planning process. This section will help you pinpoint specific Citizen Card processes and articulate the bottlenecks that you seek to improve, which will set the stage for selecting appropriate Citizen Card interventions. Before identifying the Citizen Card challenges and needs, the following principles were defined as an outcome of our research:

#### **1. Understanding the existing ecosystem**

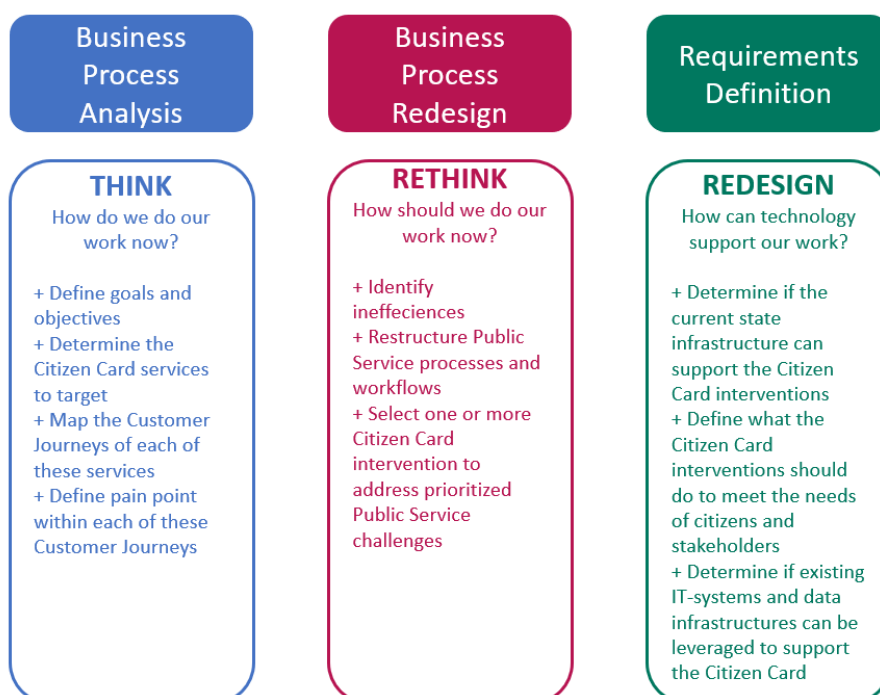
- Engage with your target end-users and consult existing research to develop an understanding of the people, networks, cultures, politics, data requirements, infrastructure, and markets that make up your ecosystem before designing your Citizen Card.
- Coordinate with other implementing departments, society, and partners early on to learn from successful and unsuccessful initiatives in the ecosystem in order to avoid duplicating efforts and to integrate with existing technical systems more easily.

#### **2. Design with the end-user**

- Incorporate multiple user types and stakeholders in each phase of the project life cycle to direct feature needs and revise the design.
- Design Citizen Card public services that improve users' current processes, saving time, using fewer resources, and improving quality.
- Develop a context-appropriate digital implementation informed by end-user's priorities and needs, considering the ecosystem and accepting that some digital approaches will not be appropriate.
- Develop the Citizen Card in an incremental and iterative manner, with clear objectives and purpose in mind.
- Embrace an iterative process that allows for incorporating feedback and adapting your implementation after initial testing and launch.

- Ensure that the design is sensitive to and considers the needs of the historically underserved.
- Be open about setting expectations and let people opt out of participating in the design process.

This process builds on the Collaborative Requirements Development Methodology (CRDM)<sup>8</sup>, a commonly used approach by representatives of the European Commission for defining the problem, identifying how it could be improved and describing how the improved process would need to function. The CRDM approach is broken down into three areas:



**Figure 2 – The three pillars of the Collaborative Requirements Development Methodology**

To map the current state of project activities first, you will need to understand how public services currently function. This requires thinking through the tasks that are performed to meet the goals and priorities. You will analyse the various processes within the public services domains and identify the bottlenecks that prevent optimal delivery of those services, resulting in a diagram of the current state.

The process for mapping the current state has three steps:

1. Determine the Citizen Card public service processes to target.
2. Map the user journey (illustrated through a workflow) within each of these processes.
3. Identify bottlenecks within each workflow.

Citizen Card processes, also called business processes, consist of a set of activities or tasks performed together to achieve the objectives of the Citizen Card project. Processes involve different personas – especially citizens – and will cross multiple levels of government.

Start by identifying all the priority processes for your Citizen Card. For each of the identified processes, list the objectives, the inputs needed, the expected outputs, the specific sets of tasks that make up the process, and the expected outcomes. Describe tasks in as much detail as possible and include every

<sup>8</sup> <https://www.path.org/resources/collaborative-requirements-development-methodology-participant-tools/>

step of the process. The process matrix shown below illustrates two examples of Citizen Card processes, objectives, tasks and outcomes.

**Table 3 – Citizen Card process matrix**

Process	Objective	Task Set	Outcomes
1. Onboarding	Create a Citizen Card registry with all users. If possible, relate it to the existing civil registry and base it on citizen consent.	<ul style="list-style-type: none"> <li>• Register citizens.</li> <li>• Search for existing personal data.</li> <li>• Maintain registry.</li> </ul>	More complete registration of Citizen Card users.
2. Access	Provide access to public services via the Citizen Card.	<ul style="list-style-type: none"> <li>• Make public services available.</li> <li>• Provide the possibility to reuse personal data (opt in or out approach).</li> <li>• Introduce fully digital processes.</li> </ul>	Efficient and effective use and access to public services.

### 3.3.3.1 Root causes of Citizen Card challenges

After identifying and describing important processes, you can further examine the Customer Journey to understand where to make improvements. Workflows, or task flow diagrams, are one way of illustrating the user journey.

Workflow diagrams are visual representations of the progression of activities (tasks, events and interactions) performed within a Citizen Card process. These diagrams help visualise specific activities within the process and illustrate the interactions between the personas who perform those activities. The result of one task generally triggers another task, until the final process objective is reached. All tasks associated with the process being mapped should appear at least once on the workflow diagram. These diagrams also map how information moves through the system and can be used to identify and illustrate where bottlenecks occur.

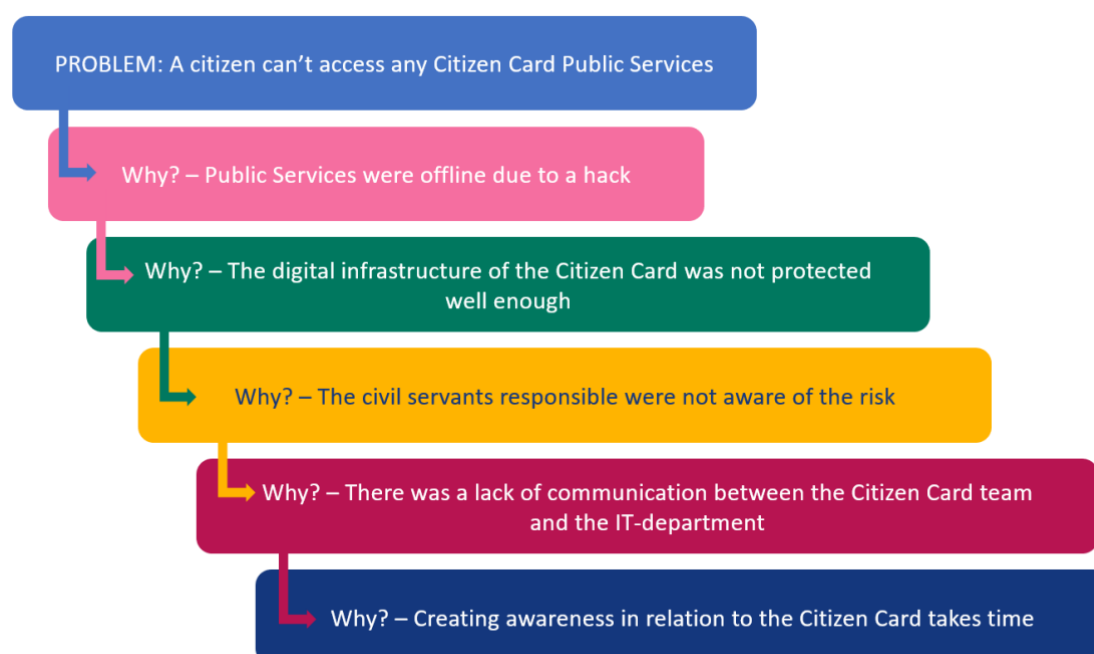
As you create the workflows, challenges, or bottlenecks should emerge. These are areas where failures in service delivery occur, where civil servants and citizens experience frustrations or citizens may be lost to follow-up. Bottlenecks are specific gaps that prevent personas from reaching their goals. Bottlenecks lead to suboptimal implementation of public services and are often a cause for failing to meet project goals.

A root cause analysis helps to identify the factors underlying the bottlenecks occurring in Citizen Card processes. This analysis narrows the list of actionable bottlenecks and determines which issues can be addressed with available resources.

Three types of root causes may emerge through this process:

1. **PHYSICAL:** tangible, material items failed in some way.
2. **HUMAN:** a mistake was made, or a requirement was not met.
3. **ORGANISATIONAL:** a system, process or policy that is used to make decisions is faulty.

The root cause analysis may also reveal situations where a Citizen Card intervention may not be warranted or ideal. The 5 Why's<sup>9</sup> method is an intuitive way to identify the root cause of a bottleneck. This method involves asking "Why does this problem exist?" five times, or until you get to the foundational roots of the problem. It is important to include those who are experiencing the problem directly to be involved in determining the "Why's". Below you find an example of the 5 Why's methodology for the Citizen Card.



**Figure 3 – Why methodology**

With a better understanding of the root causes, you can rank the bottlenecks, identifying those that impede a successful implementation of the Citizen Card. Although you may ideally like to address every bottleneck, limits on resources often require focusing on the most important challenges or the ones that you feel you can influence.

Stakeholders should discuss and review the bottlenecks and their root causes, comparing them until they agree on a ranking from most to least critical. Below you find a formula for scoring and ranking bottlenecks.

**Table 4 – Scoring methodology bottlenecks**

Bottleneck	1. How much	2. What is the	3. Is this	Score	Prioritised ranking
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<sup>9</sup> [https://en.wikipedia.org/wiki/Five\\_whys](https://en.wikipedia.org/wiki/Five_whys)

	impact does this bottleneck have on the process? (1–3)	likelihood of overcoming this bottleneck? (1–3)	important for citizens? (1–3)		
Aggregating Citizen Card data from paper or online forms is rarely done correctly	Low (1)	High potential (3)	Yes (3)	1+3+3=7	HIGH
Citizen Card users want access to more public services.	Medium (2)	Medium potential (2)	Some (2)	2+2+2=6	MEDIUM
Citizen Card users want specific discount for using public transport.	High (3)	Low potential (1)	No (1)	3+1+1=5	LOW

At this point, focus on describing the highest priority bottlenecks using a common vocabulary, so you can link them to possible interventions. Below you find a classification for Citizen Card project challenges that standardises the categories of common bottlenecks experienced at various levels of the entire system. This classification provides a consistent method for grouping the diverse ways that various participants have for expressing very granular, project-specific bottlenecks and their root causes. It also ensures that all stakeholders have a common understanding of the challenges and a consistent language for articulating the need, as well as for mobilizing support and funding.

**Table 5 – Citizen Card challenge classification**

Information	Availability	Quality	Efficiency	Cost	Accountability
Lack of population denominator	Insufficient available public services	Poor citizen experience	Inadequate process management	High cost of manual processes	Insufficient citizen engagement
Delayed reporting of events	Insufficient digital services	Insufficient Citizen Card worker competence	Poor planning and coordination	Lack of effective resource allocation	Unaware of service entitlement

Lack of quality/ reliable data	Insufficient equipment to read Citizen Card	Insufficient continuity of public services	Delayed provision of Citizen Cards and access to public services	Citizen-side expenses	Absence of citizen/community feedback mechanisms
Communication roadblocks	Insufficient supply of qualified workers	Inadequate supportive supervision/ support	Inadequate access to public services	Lack of coordinated payer mechanism	Lack of transparency in transactions
Lack of access to information or data		Poor adherence to guidelines			Poor accountability between the partner in the Citizen Card ecosystem
Insufficient utilisation of data and information					Inadequate understanding of beneficiaries
Lack of unique identifier					

### 3.3.4 Determine appropriate Citizen Card interventions

The previous section examined different Citizen Card processes and identified key challenges. This section will help you rethink the way tasks are performed and reflect on interventions to address the identified bottlenecks. The following principles should be embraced before determining the Citizen Card interventions:

#### 1. Use open standards, open data, and open innovation

- Define and communicate what being open means for your Citizen Card initiative.
- Adopt and expand on existing open standards.
- Share non-sensitive data after ensuring that data privacy needs are addressed.
- Use existing open source and/or open standards-based software where appropriate.
- Enable innovation by sharing without restrictions, collaborating widely and co-creating Citizen Card services when it makes sense in your context.

#### 2. Reuse and improve

- Identify the existing technological tools (local and global), data and frameworks being used by your citizens, in your geography or in your sector. Evaluate how these could be reused, modified or extended for use in your project.
- Develop modular, interoperable approaches instead of those that stand alone or are attempting to be all-encompassing in their features. Interoperability will ensure that you can adopt and build on components from others and that others can adopt and build on your solution in the future; and swap out systems when improved – standards and/or specifications based – solutions become available.
- Collaborate with other digital development practitioners through technical working groups, communities of practice and other knowledge-sharing events to become aware of existing solutions and to build relationships that could lead to the future reuse and improvement of your Citizen Card solution.

### 3.3.4.1 Citizen Card interventions classification

Over the past decade, a variety of Citizen Card approaches such as the ones in Gijon, Rotterdam and Zaragoza, have been tested as ways of alleviating public services challenges that have not otherwise been adequately addressed. From Citizen Card promotional messages sent to citizens, to applications that track use of services, public service interventions have been used individually (siloe) or combined with shared services using data exchange standards to form robust and extensible digital processes. To be able to select Citizen Card interventions, the four following perspectives to support these interventions can be used:

1. Citizens
2. Citizen Card providers
3. Citizen Card system managers
4. Data services

The perspectives including examples of related interventions follows below.

**Table 6 – Citizen Card interventions classification – Citizens**

Perspective	Interventions
<b>1.1 Specific citizen communication</b>	<ul style="list-style-type: none"> <li>• Transmit specific Citizen Card event alerts to specific population group(s).</li> <li>• Transmit specific Citizen Card information to citizen(s) based on user status or demographics.</li> <li>• Transmit alerts and reminders to citizen(s).</li> <li>• Transmit availability of new public services to citizen(s).</li> </ul>
<b>1.2 Generic citizen communication</b>	<ul style="list-style-type: none"> <li>• Transmit generic Citizen Card information to an undefined population (all citizens/visitors or users).</li> <li>• Transmit Citizen Card event alerts to undefined group(s).</li> </ul>
<b>1.3 Citizen to citizen communication</b>	<ul style="list-style-type: none"> <li>• Introduce peer groups for citizens.</li> </ul>
<b>1.4 Personal data</b>	<ul style="list-style-type: none"> <li>• Provide citizens with access to their own records.</li> <li>• Self-monitoring of user data by citizens.</li> <li>• Active data capture/documentation/sharing by citizens.</li> </ul>
<b>1.5 Citizen based reporting</b>	<ul style="list-style-type: none"> <li>• Reporting of Citizen Card ecosystem feedback by citizens.</li> <li>• Reporting of Citizen Card events by citizens.</li> </ul>
<b>1.6 On-demand information services to citizens</b>	<ul style="list-style-type: none"> <li>• Citizen look-up of Citizen Card information (real-time).</li> </ul>

<b>1.7 Citizen financial transactions</b>	<ul style="list-style-type: none"> <li>• Transmit or manage payments and the accompanying methods by citizen(s).</li> <li>• Transmit or manage vouchers to citizen(s) for Citizen Card services.</li> <li>• Transmit or manage incentives to citizen(s) for Citizen Card services.</li> </ul>
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**Table 7 – Citizen Card interventions classification – Citizen Card Providers**

Perspective	Interventions
<b>2.1 Citizen identification and registration</b>	<ul style="list-style-type: none"> <li>• Verify unique identity of citizens.</li> <li>• Enrol citizen for Citizen Card Public Services.</li> </ul>
<b>2.2 Citizen Card records</b>	<ul style="list-style-type: none"> <li>• Consent based racking of citizens' use status and services.</li> <li>• Manage citizen's Citizen Card records.</li> <li>• Consent based data collection and management.</li> </ul>
<b>2.3 Citizen Card provider communication</b>	<ul style="list-style-type: none"> <li>• Communication from Citizen Card provider(s) to governance committee.</li> <li>• Communication and performance feedback to Citizen Card provider(s) from partners and citizens.</li> <li>• Peer group for Citizen Card providers.</li> </ul>
<b>2.4 Citizen Card activity planning and scheduling</b>	<ul style="list-style-type: none"> <li>• Assess citizens needs and questions.</li> <li>• Identify citizens in need of support.</li> <li>• Schedule Citizen Cards provider's activities – new public services releases.</li> </ul>
<b>2.5 Citizen Card provider training</b>	<ul style="list-style-type: none"> <li>• Provide training content to Citizen Card provider(s) and partners.</li> <li>• Assess capacity of Citizen Card provider(s) and partners.</li> </ul>
<b>2.6 Record and data management</b>	<ul style="list-style-type: none"> <li>• Transmit or track Citizen Cars usage (consent based or meta data).</li> <li>• Track citizen's usage of the Citizen Card.</li> <li>• Report adverse interactions/transactions to the governance committee.</li> </ul>



**Table 8 – Citizen Card interventions classification – Citizen Card managers**

Perspective	Interventions
<b>3.1 Human resource management</b>	<ul style="list-style-type: none"> <li>• List Citizen Card workforce.</li> <li>• Monitor performance of the workforce.</li> <li>• Record training credentials of Citizen Card workforce.</li> </ul>
<b>3.2 Supply chain management</b>	<ul style="list-style-type: none"> <li>• Manage inventory and distribution of Citizen Card commodities (citizen card, readers, payment solutions, etc.).</li> <li>• Notify stock levels of Citizen Card commodities.</li> <li>• Manage procurement of commodities.</li> </ul>
<b>3.3 Citizen Card registry and statistics</b>	<ul style="list-style-type: none"> <li>• Register Citizen Card per user.</li> <li>• Certify Citizen Card per user.</li> <li>• Register deregistration Citizen Card per user.</li> <li>• Certify deregistration Citizen Card per user.</li> <li>• Track amount of Citizen Card users.</li> <li>• Track amount of inactive Citizen Cards.</li> <li>• Track amount of most accessed public services.</li> <li>• Track amount of most accessed public services per neighbourhood.</li> </ul>
<b>3.4 Citizen Card financing</b>	<ul style="list-style-type: none"> <li>• Offer citizen payment solutions.</li> <li>• Track and manage payments (prepaid, post-paid and direct payment).</li> <li>• Transmit or manage incentives to Citizen Card users.</li> <li>• Manage budget and expenditures.</li> <li>• Implement a sustainable and justified business model (public financed, citizen financed or public-private financed).</li> </ul>
<b>3.5 Equipment and asset management</b>	<ul style="list-style-type: none"> <li>• Monitor status of Citizen Card equipment.</li> <li>• Monitor information and cyber security.</li> <li>• Track regulation and licensing of equipment to prevent security flaws and data leaks.</li> </ul>
<b>3.6 Facility management</b>	<ul style="list-style-type: none"> <li>• List Citizen Card facilities and related information.</li> </ul>

	<ul style="list-style-type: none"> <li>• Assess Citizen Card facilities.</li> <li>• Maintain/upgrade Citizen Card facilities.</li> </ul>
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**Table 9 – Citizen Card interventions classification – Data services**

Perspective	Interventions
<b>4.1 Data collection, management and use</b>	<ul style="list-style-type: none"> <li>• Data collection and management (consent based or meta data).</li> <li>• Non-routine data collection and management.</li> <li>• Data storage and aggregation.</li> <li>• Data synthesis and visualisation.</li> <li>• Automated analysis, based in the FAIR-principles, of data to generate new information or predictions on future Citizen Card events.</li> </ul>
<b>4.2 Data coding and dashboard</b>	<ul style="list-style-type: none"> <li>• Parse unstructured Citizen Card data into structured data.</li> <li>• Merge, de-duplicate, and curate coded datasets or terminologies.</li> <li>• Visualise structured data through a dashboard (both provider and user perspective).</li> </ul>
<b>4.3 Location mapping</b>	<ul style="list-style-type: none"> <li>• Map location of Citizen Card facilities/structures.</li> <li>• Map location of Citizen Card events if consent is given.</li> <li>• Map location of Citizen Card users if consent is given (meta data).</li> <li>• Map location of Citizen Card partners.</li> </ul>
<b>4.4 Data exchange and interoperability</b>	<ul style="list-style-type: none"> <li>• Data exchange across Citizen Card ecosystem systems.</li> <li>• Data sovereignty for Citizen Card users.</li> <li>• Data sharing based on trust framework.</li> </ul>

Citizen Card interventions are delivered through physical and/or digital applications, which ideally are linked to supportive digital platforms comprising of shared services and enabling components (in cases where there are multiple applications); together with the people, processes and policies that support and use them to deliver public services to citizens, this application and platform make up the Citizen Card technology foundation. Successful deployment of applications requires a thorough knowledge of the ecosystem where the interventions will be deployed and whether they can be supported in that environment. Understanding this context can reveal the feasibility of implementing the Citizen Card ecosystem, as well as demonstrate where system integrations will be required.

For example, in settings with limited infrastructure and governance structures, it may be prudent to opt for less complex Citizen Card implementations until these building-block enabling factors evolve to a more mature state. Regardless, each subsequent investment in the Citizen Card ecosystem should contribute cumulative value to the functioning of public services and addressing citizen needs across the local community.

A comprehensive Citizen Card strategy establishes the vision for how public service approaches will support a Citizen Card ecosystem and provides the necessary operational details to achieve this vision. A Citizen Card investment roadmap should provide an overview of the local vision and financial implications for stepwise investment in foundational and specific Citizen Card applications and shared services. The results of one or more digital-maturity-assessment outputs provide a practical assessment of the progress of establishing different critical enabling components of governance and environment represented in the Citizen Card strategy.

### 3.3.5 Plan the implementation

The previous sections helped identify what Citizen Card interventions to implement and to create the enabling environment needed. This section examines more closely how to plan the implementation of prioritised interventions within a Citizen Card ecosystem, recognising the iterative nature of the implementation process. Before planning the implementation, the sustainable principles for building digital solutions and systems should be embraced:

- Plan for sustainability from the start.
- Develop a definition of sustainability for your Citizen Card initiative.
- Identify and implement a sustainable business model.
- Use and invest in local ICT service providers or other trusted service providers.
- Engage several government departments and integrate national strategies into local programming.
- Collaborate instead of competing and partner up to identify the best approach with the greatest impact.
- Build solutions, systems and services that can be adapted as end-user needs and the context change.

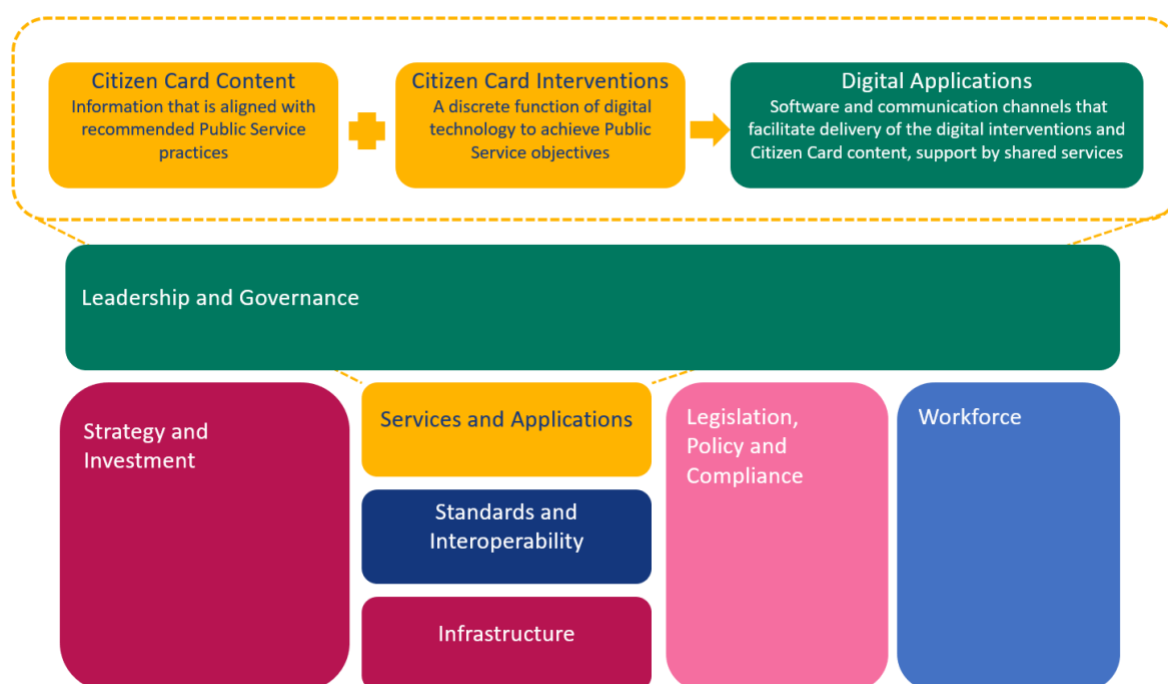
#### 3.3.5.1 Critical components of a Citizen Card

Citizen Card implementations are broadly based on the following critical components:

1. Appropriate and accurate Citizen Card content and information, and data needs for the project or Customer Journey.
2. The Citizen Card intervention itself, consisting of the discrete digital functionality being applied to achieve public service objectives.
3. Citizen Card applications, which represent the software and communication channels that facilitate the delivery of interventions combined with content, and which may be supported by shared services such as registries and an interoperability layer.
4. Foundational ICT and enabling environment (such as governance, infrastructure, legislation and policies, workforce, and enterprise architecture, including services, applications, standards and interoperability) in which the implementation is situated.

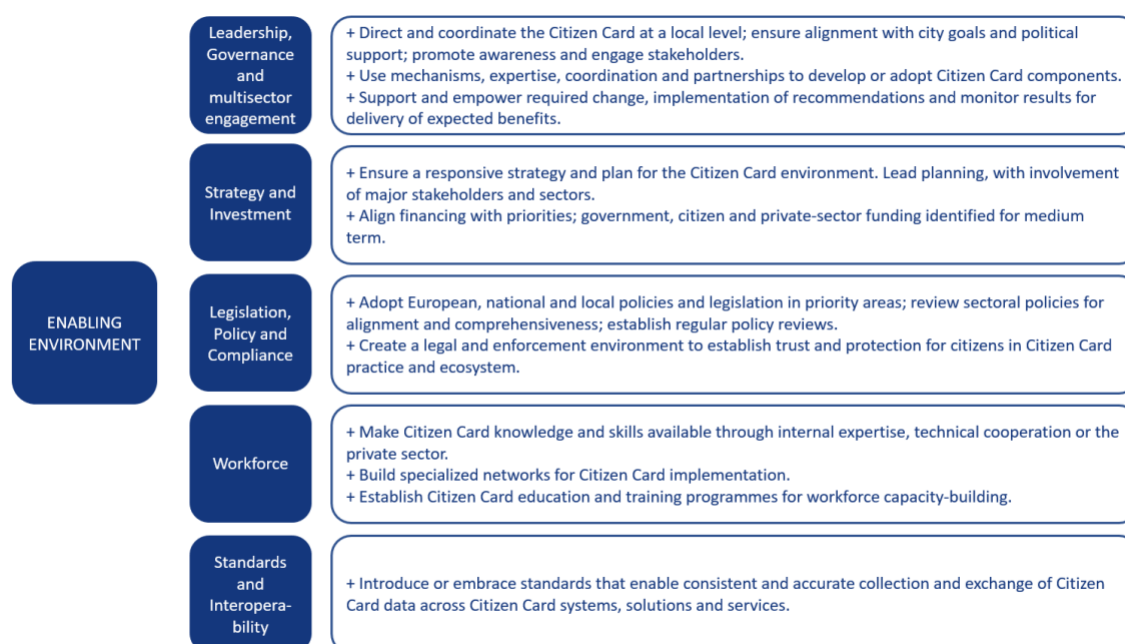
Depending on the complexity of the prioritised Citizen Card interventions and the maturity of its ecosystem, the requirements for ensuring effective implementations can vary considerably. However, for any Citizen Card application to scale and become institutionalised within a city, it must align with the infrastructure, legislation and policies, and implementation leadership and governance.

The following figure shows the essential components of a Citizen Card implementation.



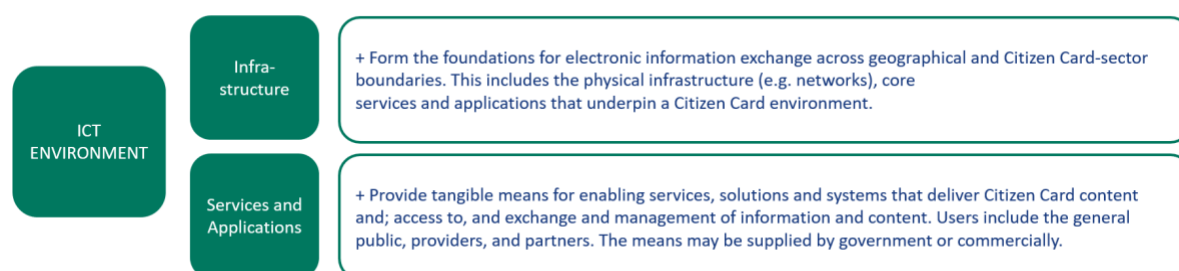
**Figure 4 – Components Citizen Card implementation**

For the essential components, it is useful to identify the roles and contributions to the overall Citizen Card strategy and ecosystem. These are needed to create an enabling environment for the initiative. An example of a selection of the components and their accompanying actions are presented below.



**Figure 5 – Enabling environment Citizen Card**

The ICT environment is considered constitute an enabling environment on its own and is represented separately below.



**Figure 6 – ICT environment Citizen Card**

Depending on your timeline, you may want to develop short-term plans that consider the current enabling environment, while contemplating medium and long-term plans that benefit from your deliberate new investments to catalyse some components of the environment to mature further. A comprehensive analysis of the enabling environment will also help you document the non-functional requirements, which describe general attributes and features to guarantee usability and overcome technical and physical constraints.

### 3.3.5.2 Key considerations for a Citizen Card implementation

This section explores the different considerations and key questions that can help guide the Citizen Card implementation. These considerations are based on the seven components for a Citizen Card as illustrated in figure 6 as well as additional factors that may influence the success of your implementation. After completing this section, you may want to reassess whether the Citizen Card interventions you selected are still feasible for your context based on your evaluation of these considerations. The following table provides several illustrative considerations.

**Table 10 – Considerations and key questions Citizen Card implementation**

Component	Illustrative considerations
Strategy and investment	<ul style="list-style-type: none"> <li>• Is there a Citizen Card strategy or investment roadmap in place? How do your identified Citizen Card interventions align with the strategy of the city and currently proposed investments in the city?</li> <li>• What new investments are required to make it possible to ensure that your Citizen Card interventions are integrated into an existing or future city enterprise architecture?</li> </ul>
Infrastructure	<ul style="list-style-type: none"> <li>• What are the conditions at the Citizen Card deployment sites?</li> <li>• What kinds of connectivity and bandwidth are available at the deployment sites?</li> <li>• If the planned intervention will use mobile technology or smart card, which types of devices are end-users familiar with?</li> </ul>
Legislation, policy and compliance	<ul style="list-style-type: none"> <li>• Are there mechanisms for ensuring the privacy and security of information during enrolment/interactions/transactions?</li> </ul>

	<ul style="list-style-type: none"> <li>• Are there relevant policies for unique IDs and identity management for Citizen Card implementations that involve citizens?</li> <li>• Are there procedures for redundant data storage in case of primary data loss?</li> <li>• Are there other policies to which Citizen Card implementations will have to adhere?</li> </ul>
Leadership and governance	<ul style="list-style-type: none"> <li>• Is there a public service governance framework or action plan, such as technical working groups?</li> <li>• Are partnership terms and formal collaborations documented in a memorandum of understanding?</li> <li>• Do separate departments or divisions oversee ICT and Citizen Card applications, solutions and systems?</li> <li>• Is there a group or committee that combines ICT staff and staff from Public Services that you should include?</li> </ul>
Workforce	<ul style="list-style-type: none"> <li>• Are training procedures in place for civil servants to build capacity with Citizen Card applications?</li> <li>• If civil servants will use a digital application (Citizen Card) concurrently with paper-based systems, how will work duplication be managed?</li> <li>• How are change management and transitioning to digital approaches being supported?</li> <li>• Are there considerations and actionable policies to support civil servants who may find their roles redundant following the introduction of the Citizen Card?</li> </ul>
Services and applications	<ul style="list-style-type: none"> <li>• Are there existing Citizen Card applications that can support the selected interventions?</li> <li>• Are there mechanisms for procuring software and hardware locally or leveraging existing software and hardware?</li> <li>• Are there processes in place for maintaining the hardware and software? How will updates to the software be launched to the end-users?</li> <li>• What are the regulations and procedures for hosting and storing data?</li> <li>• Does your implementation reference or link to shared services in the Citizen Card platform, such as identification registries?</li> </ul>
Standards and interoperability	<ul style="list-style-type: none"> <li>• Is a Citizen Card enterprise architecture or blueprint in place? Does your Citizen Card intervention use data standards that are compatible with other systems in the city?</li> </ul>

	<ul style="list-style-type: none"> <li>• Are there reusable components, such as terminology services and data dictionaries, that you could incorporate?</li> <li>• Is there an interoperability framework to help guide how systems support one another?</li> <li>• Are there maintained data exchange that will need to be considered?</li> <li>• Is there a national, regional or local interoperability mediator (for data exchange) that applications will need to leverage?</li> </ul>
Citizen Card content	<ul style="list-style-type: none"> <li>• What are the evidence-based public service guidelines from which your Citizen Card content will be derived?</li> <li>• What are the processes that will be followed to ensure that algorithms, decision support, checklists, messages, schedules and other operational components of the Citizen Card content are in line with evidence-based recommendations and best practices?</li> <li>• What are the data and indicators that are critical to the functioning of the Citizen Card intervention and the derivative outputs, such as recommended indicators and performance metrics?</li> <li>• How can you leverage and contribute to an existing data dictionary or terminology shared service?</li> </ul>

The following sections address in more detail the considerations for the components Infrastructure, Legislation, policy and compliance, Workforce and Services and applications. Additional general considerations for software are briefly touched upon.

### 3.3.5.3 Infrastructure considerations

Many Citizen Card applications and platforms have seen limited adoption and success because they were piloted in areas that had inadequate access or were otherwise inappropriately designed for the context. Understanding the available infrastructure is essential to define the scope and feasibility of the application. Several practical approaches help alleviate constraints posed by infrastructural limitations. In the early stages of planning, the following questions should be considered to ensure that the infrastructure can support the implementation or to determine whether you need to establish contingency plans.

**Table 11 – Infrastructure considerations**

Domain	Considerations
<b>Connectivity (Citizen Card via an app or smart card)</b>	<ul style="list-style-type: none"> <li>• What kind of connectivity is available at the implementation sites?</li> <li>• Do end-users have reliable coverage?</li> <li>• Do they have stable low- or high-speed internet coverage?</li> <li>• Is the physical Citizen Card readable (NFC or QR-code)?</li> <li>• If possible, speak directly with end-users or mobile network regulators about coverage and connectivity.</li> </ul>

	<ul style="list-style-type: none"> <li>• Coverage reports from mobile network operators (MNOs) often overstate connectivity or present only a snapshot of the coverage.</li> </ul>
<b>Devices</b>	<ul style="list-style-type: none"> <li>• What types of devices are used? (mobile phone or smart card?)</li> <li>• If the Citizen Card will use mobile technology,</li> <li>• What types of devices do end-users currently have? (mobile phone, tablet, smart watch or laptop?)</li> <li>• How comfortable are they with using different functions and applications?</li> </ul>
<b>Digital literacy and language</b>	<ul style="list-style-type: none"> <li>• What is the level of digital literacy (proficiency in operating digital devices) of the target population?</li> <li>• If planning to deploy the Citizen Card across regions, how will it account for variations in digital literacy in accessing information over digital devices, as well as the range of languages that the content would need to include?</li> </ul>

#### 3.3.5.4 Legislation, policy, and compliance considerations – GDPR & Consent

It is important to understand the (inter)national policies and regulations that may apply and to explore relevant global best practices when national policies are lacking. These could include regulations for hosting data and using personally identifiable information, processes for informed consent, relevant standards and linkages with other systems. A successful Citizen Card implementation plan will assess the current policy environment, adapt the design to that environment and ensure that policies are sufficiently implemented. These considerations should be evaluated in conjunction with leadership and governance considerations, as sound policy relies on leaders and governance structures to ensure its effectiveness and accountability.

During the course of this project, it became apparent that the participating cities have different views on the GDPR and its application in practice. Where some cities (e.g., Zaragoza and Gijon) have a more pragmatic approach concerning GDPR in the context of the Citizen Card, other cities have their own interpretation (e.g., Rotterdam and Eindhoven). This leads to restrictions in the use of the Citizen Card or the analysis of the data relating to the use of the Citizen Card by citizens. This is a challenge for governments and businesses. By following the guidelines in the subsequent sections, cities can apply GDPR in the way it is intended.

To comply with the GDPR it is important that the Citizen Card approach is based on the consent of end-users: citizens.

For consent to be meaningful under the GDPR, it must be:

- **Freely given** – do not try to ‘trick’ you users into consenting. Do not withdraw any other services if they choose not to consent.
- **Specific** – if you want to process a person's consent for multiple purposes, you must ask them to consent to each type of processing.
- **Informed** – provide clear information about what the user is being asked to consent to and what to do if users want to withdraw their consent.
- **Unambiguous** – use clear and simple language and present a straightforward choice.
- **Given via a clear affirmative action** – never assume to have someone's consent until they have actively agreed to something.
- Finally, once you have a person's consent, it should be easy to withdraw it.



There are several principles that should be applied in order to design a future-proof consent model.

**Table 12 – Consent model principles**

Principles	Description
<b>Active opt-in</b>	Consent requires a positive opt-in and avoid pre-ticked boxes or any other method of consent by default. Whenever binary choice is given both options should have the same prominence.
<b>Informed</b>	Consent should be clear, concise and specific about the content. Consent should not use ambiguous or generic statements.
<b>Unbundled</b>	Consent should be presented separately in a distinguishable manner from other content such as general terms and conditions, privacy notices etc.
<b>Named</b>	Consent should provide clear information about the processing organisation and information about any 3rd party involved in data processing.
<b>Easy to withdraw</b>	Consent should explicitly mention about the user's right to withdraw the consent at any time with clear withdrawal procedure. This also assumed processing organisation has established facilities to withdraw consents.
<b>Granular</b>	Organisations should provide granular consents so that consumers can consent separately for different types of processing.
<b>Continuous review</b>	Organisations should establish a process to continuously review consent with business/system changes to make sure they are in compliance with GDPR.
<b>Documented</b>	Processing organisations should keep evidence of consent such as who, when, how, and what was consented to.
<b>No imbalanced relationships</b>	When there is an imbalance between an individual and the processing organisation (cases such as public authorities and employers) it is not possible to provide consent freely. In such cases, another legitimate mean should be used instead of consent.
<b>Time limits</b>	There are no explicit rules about how long you can store personal data, but it is recommended to mention how for how long and process personal data with consent.

Processing organisations should maintain the following records to demonstrate consent from an individual:

- **Who consented** — the name of the individual, or other identifiers.
- **When they consented** — a copy of a dated document or online records that include a timestamp.

- **What they were told at the time** — a master copy of the document or data capture form containing the consent statement in use at that time, along with any separate privacy policy, including version numbers and dates matching the date consent was given. If consent was given orally, your records should include a copy of the script used at that time.
- **How they consented** — for written consent, a copy of the relevant document or data capture form. If consent was given online, your records should include the data submitted as well as a timestamp to link it to the relevant version of the data capture form. If consent was given orally, you should keep a note of this made at the time of the conversation. It does not need to be a full record of the conversation.
- **Whether consent is withdrawn** — and if so, when.

Cities or related entities can introduce such a consent management model for their Citizen Card. By following the principles and implementing a solution based on these, the Citizen Card and the related consent management is fully compliant with the GDPR.

### 3.3.5.5 Legislation, policy, and compliance considerations – GDPR & Data minimisation

There are seven basic data protection principles under EU data protection law. The principles lie at the heart of the law and, although they do not give hard and fast rules, they embody the spirit of the regulatory framework. Compliance with the principles is a fundamental building block to any good data protection practice. The seven principles are:

1. Lawfulness, fairness, and transparency
2. Purpose limitation
3. Data minimisation
4. Accuracy
5. Storage limitation
6. Integrity and confidentiality (security)
7. Accountability

The third principle of “data minimisation” (GDPR Article 5 (1) (c)), will be specifically addressed in the next sections.

The data minimisation principle requires entities to process only ‘adequate, relevant and limited’ personal data that is ‘necessary’. EU data protection law does not define what ‘adequate, relevant and limited’ means, but states that the assessment of what is ‘necessary’ must be done in relation to the purposes for processing. Because the assessment of what data is needed should be based on the purposes of the processing itself, a controller or processor should never have more data than what it needs to achieve the purposes of the processing.

If achieving the purpose of the process is not possible because personal data is insufficient, then the data is not ‘adequate’ and additional collection may be required. Data may also be inadequate if making decisions about someone is based on an incomplete understanding of the facts. If an individual asks that the information be supplemented (right to rectification), this could indicate that the data might be inadequate for the purpose.

Personal data should only be processed where it is not reasonably feasible to carry out the processing in another manner. Where possible, it is preferable to use anonymous data. Where personal data is needed, it should be adequate, relevant and limited to what is necessary for the purpose (‘data minimisation’).

To apply data minimisation with a Citizen Card, a comprehensive implementation plan that includes the following four key principles is needed:

1. **Narrow data collection**

Determining what data is essential is the first step in a successful data minimisation strategy. Organisations must narrow their data-gathering techniques to the point where only the most valuable information, however, a given entity defines that, is collected for analysis. Moreover, for the data that is collected, it is critical to set strict parameters to control the number of privileged accounts that have access to that data. These parameters should be included in any actionable initiative centred on the methodology.

## 2. **User verification and screening**

Many bulk data collection workflows function on the assumption that most users submit usable, relevant information that they own. In reality, this is not the case. Many governments unintentionally collect large amounts of dangerous data. It could be fraudulent or unconditioned, and thus generates a risk for everyone involved, simply by being stored on local servers. Strong data minimisation plans create user verification and screening processes to weed out such data. For instance, reusing information from trusted sources would significantly reduce costs and the risk of fraud. With these initial assessment procedures in place, organisations will gather only usable information from verified sources.

## 3. **Progressive data management**

User data eventually goes stale, yet many organisations do not take this into account, which results in databases stuffed with unusable or incorrect information. This is a burden for not only for the IT infrastructure but also for the greater organisation as it could negatively affect analysis. Data minimisation plans with progressive evaluation protocols avoid these issues by working with users to update their data and cultivate databases optimised for actionability. This not only saves the government time and money in the long run but continues to mitigate the risk that inevitably comes as the amount of user data increases.

## 4. **Strategic deletion**

Strategic data erasure is a core component of the data minimisation methodology. User information has a lifespan, and this has never been truer than in today's fast-moving digital marketplace. Governments must consistently purge stale data from servers to ensure the information they access is truly valuable and does not pose a security threat. As a result, all data minimisation plans should include deletion protocols. While this is already a requirement for anyone who must comply with GDPR, it is important for even those governments that may not have to adhere to it yet. Major steering decisions about an organisation should always include a discussion about the new types of data needed and any outdated types of information that no longer serve the organisation.

Anytime you store data, you are vulnerable to breaches, unverified data and more. There's no way to eliminate those risks altogether. However, organisations that pursue sound data minimisation strategies can streamline information collection workflows, gather more valuable data and reduce the risk. While many organisations – including governments – are limiting data collection and storage as a response to GDPR requirements, the benefits of minimisation go well beyond compliance.

Specifically, governments are realising the following:

### 1. **Reduced risk of data loss**

Keeping fewer records reduces the chances of a loss and the potential severity of any occurrence.

### 2. **More efficient data retrieval and storage**

Management of data is simpler when there is reduced. Knowledge workers can spend less time hunting through archives and feel more confident that they are retrieving the most current data when minimisation is being practiced in a well-disciplined manner.

### 3. **Faster responses to requests**

It is easier to respond to requests when there is less stored data.

### 4. **Enhanced citizen's approval**

Citizens prefer to be asked for fewer personal data and trust governments that provide assurances about what kind of data is stored.

#### 5. **Preparedness for future regulations**

Governments enacting data minimisation efforts now will be ahead of the game if future regulations like GDPR are passed in the future.

Additionally, governments working on a Citizen Card must ensure the personal data they are processing is:

- Adequate – sufficient to properly fulfil your stated purpose.
- Relevant – has a rational link to that purpose.
- Limited to what is necessary – you do not hold more than you need for that purpose.

It is important to note that data minimisation is not an exact science; cities implementing a Citizen Card can adopt varying approaches based on the previously outlined principles, according to their local ecosystem and legal requirements.

#### 3.3.5.6 Legislation, policy and compliance considerations – GDPR & Data portability

Article 20 of the GDPR creates a new right to data portability, which is closely related to the right of access but differs from it in many ways. It allows for data subjects to receive the personal data that they have provided to a controller in a structured, commonly used and machine-readable format, and to transmit that data to another data controller. The purpose of this new right is to empower the data subject and provide the subject with more control over their personal data.

Since it allows the direct transmission of personal data from one data controller to another, the right to data portability is also an important tool that will support the free flow of personal data in the EU and foster competition between controllers. It will facilitate switching between different service providers and will therefore support the development of new services in the context of the digital single market strategy. In this regard, WP29 (guidelines of the right to data portability)<sup>10</sup> considers that the right to data portability covers data provided knowingly and actively by the data subject as well as the personal data generated by his or her activity. This new right cannot be undermined and is not limited to the personal information directly communicated by the data subject, for example, on an online form.

As a good practice, data controllers should start developing the means that will contribute to answer data portability requests, such as download tools and Application Programming Interfaces. They should guarantee that personal data are transmitted in a structured, commonly used and machine-readable format, and they should be encouraged to ensure the interoperability of the data format provided in the exercise of a data portability request. The opinion also helps data controllers to clearly understand their respective obligations and recommends best practices and tools that support compliance with the right to data portability. Finally, the opinion recommends that industry stakeholders and trade associations work together on a common set of interoperable standards and formats to deliver the requirements of the right to data portability.

The right to data portability in the context of the Citizen Card applies:

- To personal data that an individual has provided to a data controller.
- When the processing is carried out by automated means.
- Where the processing is based on the individual's consent or for the performance of a contract.

The second and third conditions are relatively self-explanatory, but it is less clear exactly what personal data is 'provided' to a data controller.

<sup>10</sup> [https://ec.europa.eu/newsroom/article29/item-detail.cfm?item\\_id=611233](https://ec.europa.eu/newsroom/article29/item-detail.cfm?item_id=611233)

This does not simply refer to things such as names and addresses, which users hand over to create an account. It also refers to personal data that organisations gather while observing an individual's activities. This includes things such as:

- Browsing history.
- Traffic and location data.
- Raw data processed by connected objects, such as smart meters and wearable devices.

However, it does not include any additional information that the organisation has created based on the information provided, such as a user profile. As mentioned, this right to data portability is not absolute and is subject to restrictions or, on the opposite side, can only be invoked when specific conditions are met, which are covered in the rest of the first paragraph of GDPR Article 20.

The right to data portability can be exercised when the legal basis for lawful processing is either:

- Consent (one of the several possible legal bases as described in GDPR Article 6).
- Explicit consent (consent in the context of special categories of personal data or 'sensitive data' in GDPR Article 9).
- Contractual necessity (as also described in GDPR Article 6).

The right to data portability can only be exercised when, on top of the presence of consent, explicit consent or contractual necessity as grounds for lawful processing, the actual personal data processing is also carried out using automated means, which brings us back to that IT-systems and digital aspect of the right to data portability.

While developing a Citizen Card it is important to embrace these principles on data portability and create a common understanding of this in the cities own Citizen Card ecosystem. These generic principles apply for a Citizen Card, but the application of these principles could work out differently in each city depending on how strict governments want to follow these guidelines. Reliable digital infrastructure and services are critical in today's society; the coronavirus crisis has glaringly revealed this fact. A range of initiatives have been proposed or are already under discussion at EU level to accelerate the digitalisation process and enhance Europe's strategic autonomy in the digital field around three building blocks:

- Building a data framework (European Data Strategy<sup>11</sup>, Data Governance Act<sup>12</sup>, European Cloud and Data infrastructure - GAIA-X)<sup>13</sup>.
- Promoting a trustworthy environment (EU-wide cyber security certification scheme, AI-regulation and data and privacy protection).
- Adapting competition and regulatory rules (European Data Protection Board<sup>14</sup>, introducing European standards, redesign governance mechanisms).

With an adequate Citizen Card solution, cities can translate the data sovereignty needs of Europe into practice. Ensuring that European values are applied, keeping the generated data in Europe and working closely with European companies in creating sustainable, trusted and transparent solutions for the current and future generations.

<sup>11</sup> <https://ec.europa.eu/digital-single-market/en/european-strategy-data>

<sup>12</sup> <https://ec.europa.eu/digital-single-market/en/news/data-governance-act>

<sup>13</sup> <https://www.data-infrastructure.eu/GAIA-X/Navigation/EN/Home/home.html>

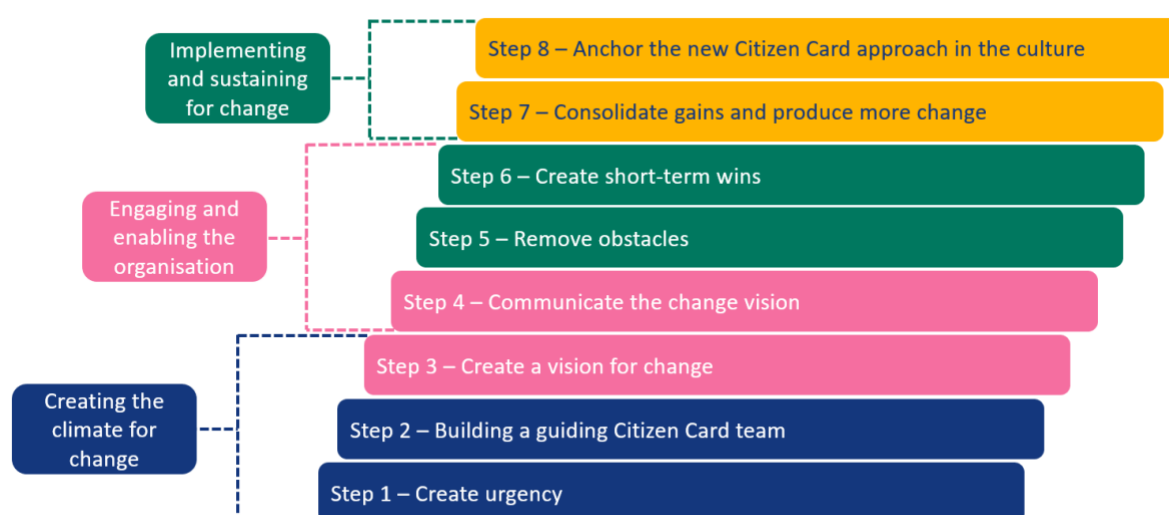
<sup>14</sup> [https://edpb.europa.eu/role-edpb\\_en](https://edpb.europa.eu/role-edpb_en)

### 3.3.5.7 Workforce and training considerations

Although some civil servants will show great enthusiasm for new technologies, introducing and institutionalising a Citizen Card and new interventions with all of the workforce or citizen end-users can be challenging. There are several ways to boost the adoption of the Citizen Card.

1. **Establish training programmes for each civil servant unit or department in the public service field and for managers involved with the implementation.**  
Intensive introductory training on how to use the new Citizen Card applications, followed by regular refresher training, is vital.
2. **Build in sufficient time to learn the new Citizen Card solution, services and system, recover from errors and increase comfort and speed in using the application within the city.**  
Start identifying champions at different levels to help inspire and motivate others. Transitioning from paper-based to digital systems is typically a phased process. Start simple, maintain technical support for end-users by levels and slowly introduce change management to develop the future state.
3. **Involve end-users. Incorporate end-user's cultural preferences, and plan to adapt the design for new contexts.**  
Also plan for changing the intervention's content and interfaces over time. Design information structures, images and icons which makes it easy to make changes if you scale to a different context. Involve end-users to make sure that the data you collect will have a purpose, assuring that collected data is actually used.
4. **Communicate expectations and best practices.**  
Ensure that everyone involved in the Citizen Card ecosystem understands the priorities and the accompanying goals and deliverables.

Kotter's eight-step change model provides guided process steps to successfully implement a Citizen Card within an organisation.



**Figure 7 – Kotter's eight-step change model**

### 3.3.5.8 Services and applications considerations

Services and applications are the devices and tools, including software used to collect, interact with, access and maintain Citizen Card information as well as the ICT systems that your interventions will integrate with and leverage. Services include all public services available for the Citizen Card end-users.

Although specific requirements for services and applications will differ based on the Citizen Card interventions that you have selected, bear in mind the following three considerations to improve the impact of your intervention:

1. **Leverage existing hardware (e.g., smart cards) or reduce procurement of new hardware.**  
Many digital implementations now rely on end-user's phones, tablets, computers or on locally procured devices for deploying interventions. Consider deployment of mobile device management tools to ensure that purchased hardware is being used for its intended purpose and to reduce wastage.
2. **Determine an appropriate software and licensing plan to execute your Citizen Card interventions.**  
Based on the landscape analysis conducted at the start of the project, you should be aware of which interventions, applications and shared services are present in your city. Consider the advantages and disadvantages of different strategies before deciding on a specific software model.
3. **Test the implementation for functionality and stability.**  
Technology vendors typically work in iterations to develop applications and organise tests to assess the application's usability and stability. Note that this testing should be planned as part of a deployment strategy with continual end-user experience tests until the application is ready to scale. Make sure you conduct the following tests: end-user experience test, functionality test, end-user acceptance test and a load/stress-volume test.

### 3.3.5.9 Software considerations

There are several software models available of which any could fit in your local context. The table below provides a brief description of possible models:

**Table 13 – Software models to consider**

Model	Benefits	Risks
<b>Custom-developed software</b> Build a software system from scratch	<ul style="list-style-type: none"> <li>You have control over technology, functionality and design.</li> <li>The development experience creates ownership and improves sustainability.</li> <li>It is possible to engage the local IT industry.</li> </ul>	<ul style="list-style-type: none"> <li>Custom development tends to be difficult to manage with time and budget restrictions.</li> <li>Control over design does not guarantee satisfaction with the end product, as that depends on the capabilities of the technical team.</li> <li>Long-term support depends on the continued availability of individuals.</li> </ul>
<b>Commercial off-the-shelf software</b> Buy a commercially available product	<ul style="list-style-type: none"> <li>The lead time from selection to implementation is normally shorter.</li> <li>You can evaluate it before buying.</li> </ul>	<ul style="list-style-type: none"> <li>Often expensive and sold with unclear and complex fee structures, for example, a fee-per-server processor or</li> </ul>



	<ul style="list-style-type: none"> <li>• The product is maintained and upgraded (at a cost).</li> <li>• It has normally been tested and refined in other implementations.</li> </ul>	<p>transaction in the cloud.</p> <ul style="list-style-type: none"> <li>• Commercial off-the-shelf software is not often designed for implementation in low resource settings.</li> </ul>
<b>Free packaged software</b> Software developed by a donor organisation or technical agency or a system developed by a neighbouring city	<ul style="list-style-type: none"> <li>• Shorter lead time.</li> <li>• Possibility to evaluate.</li> <li>• No upfront cost (but maintaining or customising it may require investment).</li> </ul>	<ul style="list-style-type: none"> <li>• There is often no contract, so service and warranty for bug-fixing depends on goodwill of one or two individuals and there is no institutional support.</li> <li>• Many deployments and running costs are hidden.</li> </ul>
<b>Open-source software</b> The source code as well as the software product is accessible to anyone. Often, a community has been formed to support and contribute to the development of the open-source software.	<ul style="list-style-type: none"> <li>• You have the right to make changes to the software.</li> <li>• You can engage the local IT industry</li> <li>• Benefit from communities and share development costs with other organisations.</li> </ul>	<ul style="list-style-type: none"> <li>• Can end up with a poorly supported product.</li> <li>• A loosely knit community might not be able to provide the business relationship you need.</li> <li>• Some of the implementation and running costs are hidden.</li> </ul>
<b>Software as a Service (SaaS)</b> Database and application hosted on remote servers/cloud, and software is sold (or offered for free) as a service that can be contracted per user, per month or year or per transaction	<ul style="list-style-type: none"> <li>• Highly feasible to implement and maintain.</li> <li>• Clarity about the cost to implement and run a SaaS application.</li> <li>• Investment in improved software can easily be shared among departments and partners.</li> </ul>	<ul style="list-style-type: none"> <li>• Data hosted on remote servers/cloud: not always in agreement with national or local policies.</li> <li>• Cities are often not able to pay a regular service fee.</li> </ul>

### 3.3.6 Link the Citizen Card implementation to the broader Enterprise Architecture

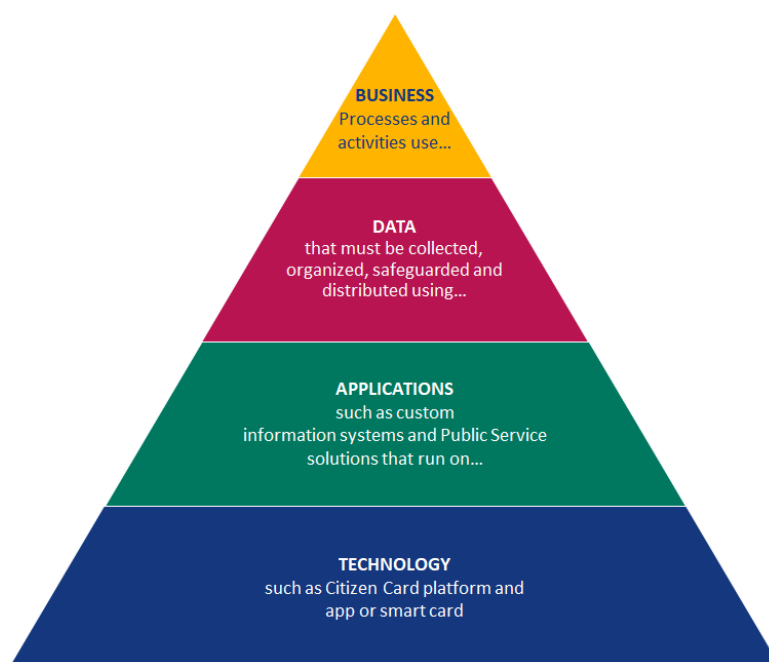
A Citizen Card architecture, if available in the city, outlines current and planned business processes, data, systems and technologies and provides an overview of the standards, information exchange and interoperability profiles that can be optimised across the ecosystem. A clearly established enterprise architecture describing how different processes, data, systems and technologies function together is



crucial for guiding interoperability to support data exchange between public services, as well as collective functioning goals. An enterprise architecture blueprint lays the foundation for scaling up and sustaining Citizen Card applications that are standardised and interoperable and that will facilitate access to higher quality, more complete information resulting in better decision-making and improved outcomes across multiple areas. This section provides a view of the necessary building blocks and a rational method of understanding, defining and manageably implementing interventions. It also introduces a generic high-level architecture to support a white label Citizen Card solution and lists considerations for the architecture.

### 3.3.6.1 Citizen Card and enterprise architectures

Typically, there are four layers or viewpoints that describe various aspects of the Citizen Card architecture.



**Figure 8 – Citizen Card architecture viewpoints**

Although this type of architectural vision may not exist or be fully developed for your context, it is possible to consult the TOGAF framework<sup>15</sup> to understand the different components typically found in developing a shared Citizen Card enterprise architecture. TOGAF is an industry-standard enterprise architecture methodology, providing detailed guidance to support the establishment of a flexible, integrated hierarchy of business, data, applications and technology architectures to optimise digital interventions. Understanding the current architecture and its constituent functional and technical component parts will facilitate an understanding of the gap between what currently exists and can be leveraged, also what may be missing, requiring further targeted investment through your implementation plan. Lastly, depending on the complexity of the architecture, it may be helpful to consider a system's audit and seek the assistance of an expert in data exchange to make sure that the architecture is sustainable as the needs for digitalisation evolve within and across public services.

### 3.3.6.2 Architectural choices Citizen Card Design

Several core principles should drive the architectural choices reflected in the Citizen Card design:

- 1. Data collection is integrated into the workflow.**

<sup>15</sup> [https://nl.wikipedia.org/wiki/The\\_Open\\_Group\\_Architecture\\_Framework](https://nl.wikipedia.org/wiki/The_Open_Group_Architecture_Framework)

This principle reflects the fact that for data quality and timeliness to improve, the use of data must be woven into the fabric of each workflow participant's business processes. All data will be captured electronically, as soon as possible and as close as possible to the step in the workflow where the data are generated.

2. **Data will be shared to support multiple workflows and** end-users have access to the data. Data access is necessary to perform duties and offer services. To improve data quality and use, the workflow participants must have access to actionable and comprehensive data.
3. **Interoperability and openness.**  
The preference is to adopt existing standards wherever possible and to adapt them where necessary.
4. **Sustainability.**  
This principle means that simple, stable, readily adoptable solutions are favoured over technologically 'sophisticated' ones that will be difficult to deploy.

### 3.3.6.3 European buildings blocks for the Citizen Card Architecture

There are three main European building blocks that a Citizen Card architecture and interoperability framework should be based on.

1. **The European Interoperability Reference Architecture (EIRA®)**<sup>16</sup>  
EIRA® is an architecture content metamodel defining the most salient architectural building blocks (ABBs) needed to build interoperable e-Government systems. The EIRA® provides a common terminology that can be used by people working for public administrations in various architecture and system development tasks. The EIRA® was created and is being maintained in the context of Action 2016.32 of the ISA<sup>2</sup> Programme. The EIRA® uses (and extends) the ArchiMate language as a modelling notation and uses service orientation as an architectural style.
2. **The European Interoperability Framework (EIF)**<sup>17</sup>  
EIF gives specific guidance on how to set up interoperable digital public services. It offers public administrations 47 concrete recommendations on how to improve governance of their interoperability activities, establish cross-organisational relationships, streamline processes supporting end-to-end digital services and ensures that both existing and new legislation do not compromise interoperability efforts.
3. **Minimal Interoperability Mechanisms (MIMs)**<sup>18</sup>  
MIMs provide the technical foundation for procurement and deployment of urban data platforms and end-to-end solutions in cities and communities worldwide. This is a set of minimal capabilities needed for scalable and interoperable digital services and supported by technical and open specifications.

The frameworks provide a description and guidelines of a common architecture/framework, including a layered overview positioning of all the components and interfaces, as well as the associated requirements and specifications. They include a description of reference implementations, including conformance testing and/or feedback from market use validation.

### 3.3.6.4 The white label Citizen Card Architecture

Each city is different from one another, which is reflected by their approach to digital transformation. But while differing in many respects, cities also share common needs:

- Increasing efficiency and effectiveness of government.

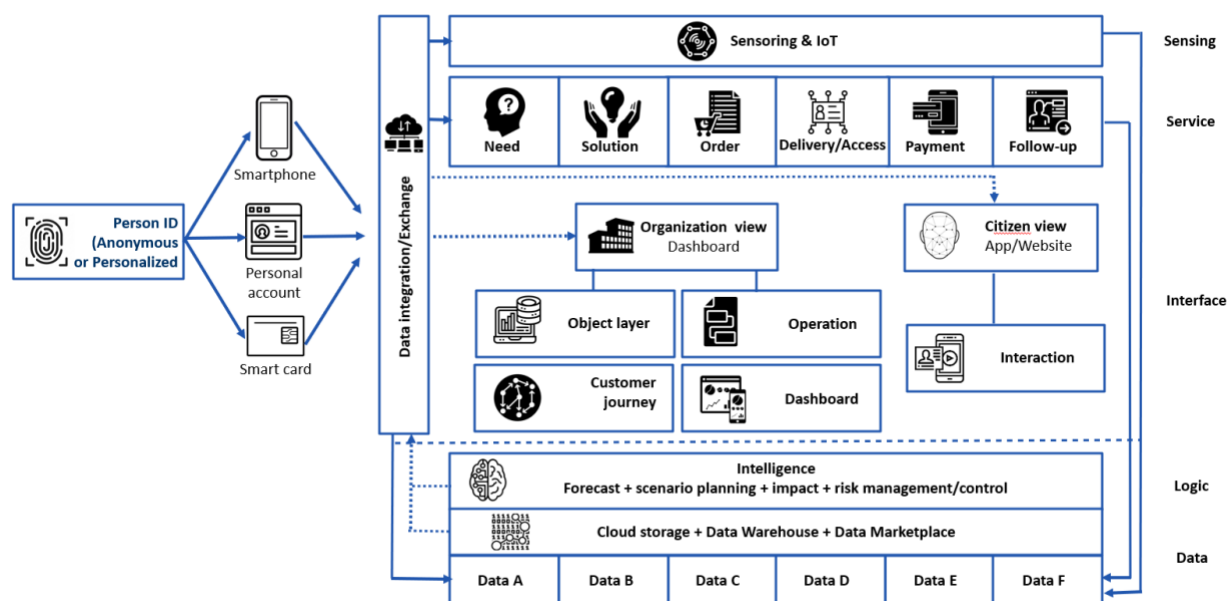
<sup>16</sup> <https://joinup.ec.europa.eu/collection/european-interoperability-reference-architecture-eira/solution/eira>

<sup>17</sup> [https://ec.europa.eu/isa2/eif\\_en](https://ec.europa.eu/isa2/eif_en)

<sup>18</sup> <https://oasc.atlassian.net/wiki/spaces/OASCMIM/overview>

- Driving down costs of innovation and procurement.
- Policymaking based on growing and improved data.
- Stimulating the local economy and innovation ecosystem.

The same goals and needs are relevant in preparation of the white label Citizen Card. To support these and make use of existing architecture, principles, standards, and guidelines as introduced by the European Commission and widely accepted public and private initiatives, solutions such as EIRA®, EIF and MIMs should be at the heart of an architecture approach. The following generic, high level architecture is based on the input of the participating cities, developments in Europe and additional research:



**Figure 9 – Generic Citizen Card architecture**

### 3.3.6.5 Citizen Card component considerations

The following table contains considerations per component of the Citizen Card architecture to support cities that want to embrace this architecture and implement a white label Citizen Card:

**Table 14 – Citizen Card components and considerations**

Componen	Considerations
<b>(Digital) identity</b>	<ul style="list-style-type: none"> <li>• Introduce an anonymous (e.g., QR-code) or personalised card.</li> <li>• Ensure that a personalised Citizen Card is based in a unique identifier which is accepted and used by all partners in the ecosystem.</li> <li>• Ensure that end-users have control over their own personal data (privacy by design and consent model at its core).</li> <li>• Take appropriate security measures (data protection).</li> <li>• Apply the Once-Only Principle. Reuse personal data as much as possible.</li> </ul>

	<ul style="list-style-type: none"> <li>• Introduce several functionalities based on the digital identity (identification, authentication, confirmation, data sharing and a qualified digital signature).</li> </ul>
<b>Instrument (smart card, app or web account)</b>	<ul style="list-style-type: none"> <li>• Provide multiple instruments to reach the maximum level of inclusion.</li> <li>• Link the instruments to each other.</li> <li>• Provide online and offline options to enrol for each instrument.</li> <li>• Ensure that all instruments are compliant with European identity and security regulations.</li> <li>• Provide end-users with a digital vault to have insight in their data, interactions and transactions.</li> </ul>
<b>Data integration/exchange layer</b>	<ul style="list-style-type: none"> <li>• Introduce a centrally managed distributed data exchange layer between information systems that provides a standardised and secure way to produce and consume services.</li> <li>• Share and/or develop a network of trust service providers and trusted sources to deliver, delete or enrich data.</li> <li>• Implements an authorisation framework that is used to manage access rights to services. Access rights management is based on the organisation and service level identifiers.</li> <li>• Provide monitoring and reporting capabilities that can be used to collect operational reporting data and technical monitoring information from the Citizen Card ecosystem.</li> <li>• Provide built-in support for cross-border data exchange through federation, which means joining together two or more ecosystems. Members of the federated ecosystems can publish and consume services with each other as if they were members of the same ecosystem.</li> <li>• Timestamp all activities.</li> <li>• Name a data exchange authority which provides certifications for organisations in the ecosystem and oversees and regulates the ecosystem.</li> </ul>
<b>Customer Journey Manager (service – from need to follow-up)</b>	<ul style="list-style-type: none"> <li>• Introduce a generic Customer Journey methodology.</li> <li>• Include the end-users through surveys and testing prototypes.</li> <li>• Provide fully digitalised processes including real-time payment options.</li> <li>• Deliver the services according to the general behaviour and wishes of the end-users.</li> <li>• Generate and analyse data to upgrade services continuously.</li> </ul>

	<ul style="list-style-type: none"> <li>• Include an easy-to-use feedback loop for partners and end-users.</li> </ul>
<b>Organisation view (interface)</b>	<ul style="list-style-type: none"> <li>• Determine KPIs (for the organisation and for end-users).</li> <li>• Develop real-time dashboards to oversee the operations and end-user satisfaction.</li> <li>• Introduce an inventory of objects and include remote maintenance.</li> </ul>
<b>Citizen View (interface)</b>	<ul style="list-style-type: none"> <li>• Provide a portal for citizens to control, change or share their data and see their interaction and transaction history.</li> <li>• Provide options to citizens to modify their digital vault (add components, data or functionalities).</li> <li>• Develop real-time communication channels for support.</li> </ul>
<b>Intelligence (logic)</b>	<ul style="list-style-type: none"> <li>• Determine your Citizen Card ecosystem data logic to support informed decision-making.</li> <li>• Create scenarios for risk management to avoid security breaches and data leaks.</li> <li>• Develop forecasting dashboards to optimise operations and the quality of services.</li> <li>• Determine the impact KPIs for the organisation and the end-users and measure them continuously to translate into rich and useful data.</li> </ul>
<b>Data management layer (Data)</b>	<ul style="list-style-type: none"> <li>• Introduce a data governance and data management model for the Citizen Card ecosystem</li> <li>• Research cloud and on-premises cloud solutions to match your needs and wishes.</li> <li>• Prevent unnecessary data lakes which could become a single point of entrance/failure.</li> <li>• Introduce a Citizen Card data marketplace to provide access to trusted parties and share data from trusted sources based on specific access rights.</li> <li>• Develop algorithms to analyse the available data to optimize the services.</li> </ul>
<b>Sensing and IoT (sensing layer)</b>	<ul style="list-style-type: none"> <li>• Determine which sensors should be accessed by end-users and why.</li> <li>• Provide access to IoT devices based on the unique identity, access rights and the accompanying Citizen Card instrument.</li> <li>• Determine the necessary information and cybersecurity requirements.</li> </ul>

### 3.3.6.6 Identify common and enabling components

When linking your Citizen Card implementation to the broader city enterprise architecture, consider the core functionalities, or components, that are unique to your use case or public service, as well as the components that can be generalised and reused in other areas. These common components (also called reusable components) represent opportunities for joint investment, allowing you to stitch together and harmonise different Citizen Card interventions across sectors, while also facilitating the establishment of a common architecture from which all Citizen Card implementations can benefit. These reusable components may also be used outside the Citizen Card ecosystem and shared with other cities.

The following are examples of common components that can be extended across other implementation areas:

- Authentication services to determine access and control privileges.
- Identity management services, such as unique IDs for citizens.
- Terminology services and reference data supporting metadata needs, including data elements and indicators.
- Geolocation services.
- Payment services to facilitate financial transactions.
- Analytics engines supporting dashboards and similar tools.
- Scheduling and decision-logic engines.
- Data warehousing to support storage and archiving using common standard formats.
- Data exchange to create a “interoperability layer”.
- Data marketplace to provide access to data from trusted sources based on specific access rights.

### 3.3.7 Develop a sustainable budget and business model

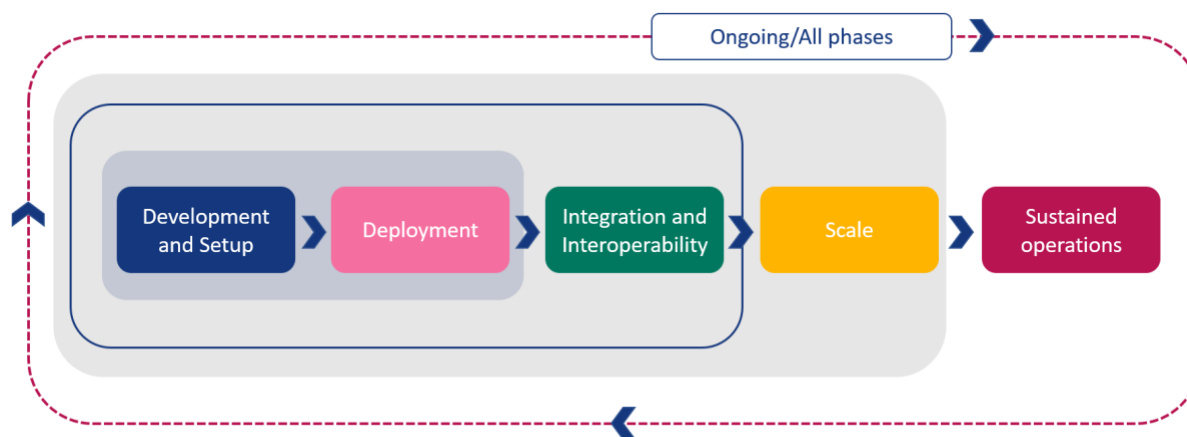
This section will help you develop a budget for implementing and sustainably operating your Citizen Card ecosystem. You can identify cost drivers for each phase of the implementation, including budget considerations related to interoperability, and you will develop a budget for the lifespan of the investment. When developing a sustainable budget, it is important that you design the preferred solution, system or service to scale based on the following considerations:

- Plan and design for scale from the start.
- Develop a definition of scale for your Citizen Card initiative.
- Keep your design simple, flexible and modular to make it easy to change your content and adapt to other contexts.
- As you make technology choices, think about whether those choices will make it easier or harder to scale.
- Identify partners early who can help scale your Citizen Card and approach.
- Consider your funding model, including the cost per end-user, options for generating revenue, social business models and other financial paths to sustaining the initiative.
- Gather evidence and demonstrate impact before attempting to scale.
- Do not attempt to scale without fully validating that your Citizen Card initiative is appropriate in a new context and addresses your priorities.

#### 3.3.7.1 Cost by phase of implementation

The full costs of Citizen Card implementations are frequently underestimated because budgets often focus on the costs related to the initial demonstration or deployment and do not consider the resources needed for long-term operation, maintenance and upgrades or expansions. Inaccurate budget estimates can thwart the sustainability of interventions, especially when demonstrations or

pilot projects transition to programmes operating at scale. Understanding the total cost of ownership, or the resources required to support a Citizen Card ecosystem throughout its life cycle, will help you make more informed purchasing decisions and better communicate funding requirements to donors, partners and other stakeholders. When considering the total cost of ownership and developing a budget, it is important to consider costs associated with different phases of implementation.



**Figure 10 – Cost phases when implementing a Citizen Card**

0. **Ongoing/All** **phases**  
This is not a distinct phase, instead it refers to elements that affect the budget across the implementation life cycle, such as human resources and governance.
1. **Development and setup**  
During this phase, you design and prepare for implementation. You will incur many of the costs during this phase, including workflow mapping and defining the future state. You will also begin working with technology vendors and purchasing the equipment needed to support the deployment. Within this phase, you should begin to think through requirements for interoperability and exchange with other systems, adopting appropriate standards and ensuring that the intervention leverages any relevant existing components or ICT systems, such as data exchanges and registries.
2. **Deployment**  
During this phase, the Citizen Card implementation goes live, often in a pilot setting. It is important to budget resources to support end-user testing and iteration for refinement during this phase.
3. **Integration and interoperability**  
Although these elements should be addressed during design and deployment, their importance to long-term sustainability have them mentioned in a separate phase. They may need to be reviewed and updated continuously. As your deployment expands and the Citizen Card enterprise architecture evolves, reflect on the additional needs for your implementation to integrate and exchange data with existing systems.
4. **Scale**  
You will begin to expand the reach of your Citizen Card implementation during this phase, so consider the number of future end-users and the cost per end-user to deploy your intervention on a larger scale. During this phase, you may need to invest a significant portion of expenses in long-term assets, such as purchasing equipment or improving facilities, as well as the human resources needed to maintain the quality of the deployment.
5. **Sustained operations**

After your Citizen Card implementation scales, you will enter sustained operations. Consider recurring costs during this phase, as well as continued monitoring and evaluation, ongoing data-use activities and ways to share learnings with the larger community. The annual sustained operations costs will be key in determining feasibility of sustaining the digital implementation in the long run. The estimated annual sustained operations costs can be used to request government budgetary allocations in future years.

### 3.3.7.2 Cost drivers

For each of the phases of implementation you should identify the specific cost categories and their related cost drivers that will affect your budget. Illustrative examples of cost categories and the factors or cost drivers that influence (increasing or decreasing) those cost categories that are associated with each phase of the implementation are taken up in the table below.

**Table 15 – Cost drivers per phase of implementation**

Phases	Cost drivers	Up-front versus recurring costs
<b>Ongoing/All phases</b>	<ul style="list-style-type: none"> <li>• Management and staffing</li> <li>• Governance</li> </ul>	Recurring
<b>Development and setup</b>	<ul style="list-style-type: none"> <li>• Software licensing</li> <li>• Software customisation</li> <li>• Application installation and configuration</li> </ul>	Up-front
<b>Deployment</b>	<ul style="list-style-type: none"> <li>• End-user testing</li> <li>• Training</li> <li>• Roll-out</li> </ul>	Recurring
<b>Integration and interoperability</b>	<ul style="list-style-type: none"> <li>• Data collection, protection and use</li> </ul>	Recurring
<b>Scale</b>	<ul style="list-style-type: none"> <li>• Any category that will be affected by the expanded reach</li> </ul>	Recurring
<b>Sustained operations</b>	<ul style="list-style-type: none"> <li>• Hardware and software maintenance</li> <li>• Subscriptions</li> <li>• Training activities</li> <li>• Monitoring and evaluation activities</li> <li>• Data use activities</li> <li>• Sustainable maintenance and upgrading</li> </ul>	Recurring



### 3.3.7.3 Budget matrix

Once you have identified your cost categories by investment phase and the related drivers of those cost categories, use a budget matrix to create a detailed budget for your implementation across the expected life span before the intervention will require significant updates. This time frame is typically about five years but could be longer or shorter depending on the selected intervention. Budget matrices are also useful for comparing costs across Citizen Card interventions. You could use financial data in historical procurement records and from past implementations, along with RFPs from developers and implementers to complete the budget matrix. In creating your budget, be sure to indicate components that would be funded through the existing programme to show city and partner co-investment. A basic budget matrix to start with is presented below.

**Table 16 – Sample budget matrix for implementation**

Phase	Cost driver	Up-front versus recurring	Year 1	Year 2	Year 3	Year 4	Year 5	Total
<b>Ongoing/ All phases</b>	<ul style="list-style-type: none"> <li>• Management and staffing</li> <li>• Governance</li> </ul>	Recurring						
<b>Development and setup</b>	<ul style="list-style-type: none"> <li>• Software licensing</li> <li>• Software customisation</li> <li>• Application installation and configuration</li> </ul>	Up-front						
<b>Deployment</b>	<ul style="list-style-type: none"> <li>• End-user testing</li> <li>• Training</li> <li>• Roll-out</li> </ul>	Recurring						
<b>Integration and interoperability</b>	<ul style="list-style-type: none"> <li>• Data collection, protection and use</li> </ul>	Recurring						
<b>Scale</b>	<ul style="list-style-type: none"> <li>• Any category that will be affected by the expanded reach</li> </ul>	Recurring						
<b>Sustained operations</b>	<ul style="list-style-type: none"> <li>• Hardware and software maintenance</li> <li>• Subscriptions</li> <li>• Training activities</li> </ul>	Recurring						

	<ul style="list-style-type: none"> <li>• Monitoring and evaluation activities</li> <li>• Data use activities</li> </ul>							
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While preparing your implementation plan, as mentioned in the previous chapters, you should also be able to demonstrate how this investment will improve the status quo in terms of projected impact. This may include proving the comparative value of this Citizen Card investment over other types of activities, including non-digital investments.

### 3.3.8 Monitor the implementation and use data effectively

Although monitoring and evaluation (M&E) has historically been used as an accountability and reporting tool, it can also drive growth and improvement. Monitoring during deployment can ensure that the entire operation functions as intended, from the intervention's performance to the way in which end-users interact with the intervention to the kind of data that the intervention generates. Ultimately, you will need to demonstrate the added value of the Citizen Card implementation and, where possible, the contribution to improved public services outcomes.

Planning to deploy a Citizen Card intervention includes determining what to monitor and identifying what to evaluate to ensure that the intervention is working as planned and has the effects that you expected. These efforts may include tracking performance, changes in processes, public service outcome, end-user satisfaction, cost-effectiveness or shifts in knowledge and attitudes. Monitoring and evaluation and continuous improvement by responding to the changes induced by the Citizen Card implementation, also known as adaptive management, are necessary components to guarantee the viability and ultimate impact of your efforts. Data-driven development and decision making is vital in managing the Citizen Card properly.

To support this, there is a list of data related principles:

- **Design for measurable impact.** Determine tangible Key Performance Indicators per product or service.
- **Make use of existing data,** including open data sets and data from interoperable systems.
- **Use rigorous data collection methods.** Consider and address potential biases and gaps in the data collected, perform data quality checks, and maintain strong documentation behind collected data.
- **Close knowledge gaps** by contributing data to the development community and using data and interoperability standards.
- **Use quality real-time or timely data** to support rapid decision-making, improve programming for end-users and inform strategy.
- **Present data in formats that are easy** to interpret and act on, such as data visualisations.
- **Create a culture of data use** by prioritising capacity-building and data-use efforts across all stakeholder groups, including the groups whose data are being collected.
- **Be holistic about data collection and analysis.** Collect data from multiple sources and use a mix of data collection and analysis methods. Analyse your data collaboratively with stakeholders.
- **Identify and use open data** and interoperability standards.
- **Collect and use data responsibly** according to international norms and standards.

After going through the steps to plan the Citizen Card implementation, but prior to deploying the implementation, you can embed mechanisms to monitor the implementation, such as collecting

baseline data and use the insights from the emerging data to increase your implementation's impact and efficiency.

Together, these processes support flexible, responsive project design that will enable you to refine your implementation as circumstances change and priorities shift. The backbone of this success is rigorous, rapid and continual M&E, which enables a steady cycle of learning, iterating and adapting.

### 3.3.8.1 Monitoring and evaluation (M&E)

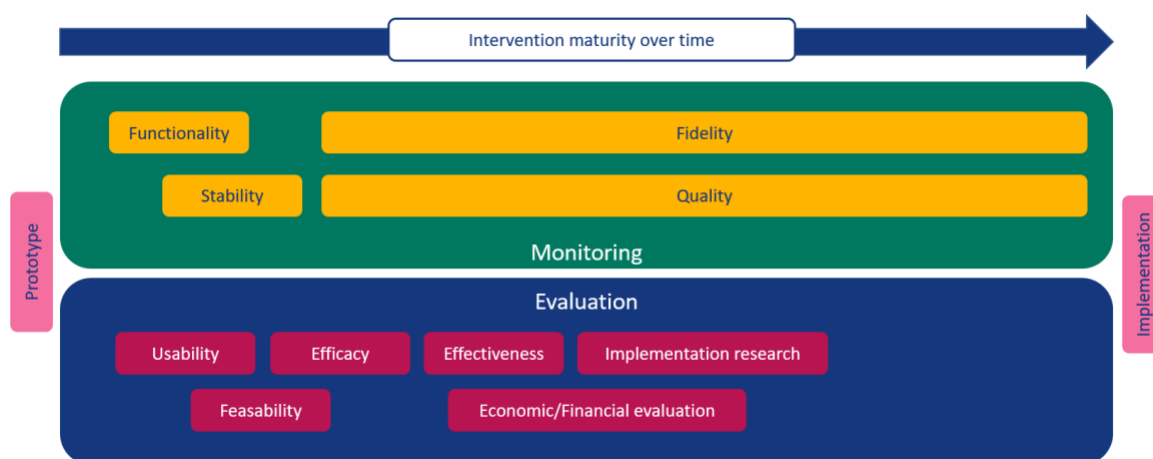
Monitoring helps answer the question: 'Is the intervention working as intended?'. Monitoring digital interventions often using routinely collected data, can measure changes in performance over time and allow for adaptive management or course correction based on the results. Monitoring and processes for taking action, create tight feedback loops that stimulate ongoing planning and learning. This is critical to create a culture of data use and fostering adaptive management. Effectively monitoring your intervention enables you to identify issues in software code, recognise when end-users are facing challenges and make sure that the intervention is achieving the targets you have set. Plan for and support these essential monitoring activities early in the design process, but also be sure to build them into all stages of the implementation's life cycle.

As the implementation matures, monitoring activities may focus on the intervention's fidelity and quality: do the realities of field implementation alter the functionality and stability of the intervention? Does the content and delivery of the intervention have a high enough quality to yield intended outcomes? Finally, as the intervention scales, monitoring may increasingly focus on its integration with the broader Citizen Card system and the policy environment surrounding – for instance – data privacy, management and use. It is during this time that the appropriate levels of training and end-user support should be in place to maintain fidelity of impact, within budget constraints.

Evaluation is the systematic assessment of an ongoing intervention to determine whether it is fulfilling its objectives and to demonstrate an effect on specific outcomes. A formal evaluation allows you to attribute a range of outputs, outcomes or economic values to the intervention, which can show evidence of benefit. If you are planning an intervention that will require evidence to receive political or financial support for scale, generating this evidence in an early deployment will help you create a strong case. Evaluation is also an increasingly important consideration for the Citizen Card field as it works to harmonise and learn from various deployments, shifting from small-scale pilots to the broader institutionalisation of public services offered via the Citizen Card.

In addition, evaluation can help you understand if your intervention is having the intended programme impacts, such as citizen access and use of services, efficiency of the public services offered and their quality. However, evaluation can be resource intensive and requires staff with a strong background in research design and evaluation to support the work. Evaluation needs will also evolve throughout the implementation life cycle. Initially, the evaluation may focus on determining whether the intervention has an effect on public service practices and outcomes, such as improving citizen experience, having a bigger impact or increasing timeliness of services. The focus of evaluations will gradually shift to economic assessments and implementation research questions that explore issues surrounding scale, sustainability and changes in policy and practices.

Ideally, M&E occurs in close balance with each other and are structured to answer questions that are most relevant at each stage of the implementation. At the early stages, you could use M&E results to iteratively redesign and test the intervention to better meet the needs of end-users and the organisation. Below is a visualisation of the possible evolution of M&E needs during the development and deployment stages of implementation.



**Figure 11 - Evaluation of monitoring and evaluation needs**

The RE-AIM framework<sup>19</sup> is considered a comprehensive way to think through your M&E needs as you scale up the implementation. The following are the components of the RE-AIM framework:

1. **Reach**  
the level of penetration of an intervention in terms of the proportion of eligible participants who receive the intervention.
2. **Effectiveness**  
the impact on targeted outcomes, including potential negative effects.
3. **Adoption**  
the absolute number and proportion of organisational units, individuals or settings that adopt a given intervention.
4. **Implementation**  
the fidelity to the various elements of an intervention's protocol, including consistency of delivery as intended and the time and cost of the intervention; at the individual level, implementation refers to clients' use of the intervention strategies.
5. **Maintenance**  
the extent to which a programme or policy becomes institutionalised or part of routine organisational practices and policies.

### 3.3.8.2 Establishing a culture of data use

To sustain a Citizen Card implementation, there needs to be a culture that values the collection of high-quality data, as well as the actions taken because of that information. M&E that produces believable data can help foster a culture of data use in which:

- People demand and seek out high-quality data to inform their decision-making.
- People are motivated and empowered to act on the data.
- Managers support those who are collecting the data and reinforce transparent use of data.
- Leadership implements data policies that stress the value and systematic collection of data while modelling the use of data.

Consistent use of high-quality data leads to all kinds of benefits like having better indicators for strategic planning, better day-to-day decision-making, better control and oversight and reduced administrative burden.

<sup>19</sup> <https://www.re-aim.org/about/what-is-re-aim/>

High-quality of data is important, but quality itself does not guarantee data use at an individual, citizen, community or organisational level. Additionally, while a trained unit of data end-users is critical, data must meet the requirements of multiple end-users and end-user scenarios, informing both local policy and service delivery. Furthermore, the right people (at all levels) must be able to get the information they need, when they need it, for their purposes.

When presented with actionable information that has been aggregated to reflect the needs of different end-users, individuals are more likely to use data for decision-making. Building a culture of data use requires careful planning, steady application and the decision-making infrastructure to allow room for change. Data, to be actionable, must be translated from complex charts, figures and databases into digestible information and a clear series of messages and directives.

As individuals increasingly use data to make day-to-day decisions, they will gradually become more invested in the quality of that data, even working to improve it. Data use is therefore a cyclical process. As the quality improves, end-user's confidence in that data will also increase, and they will be more likely to use the data to base their decisions on. Teams should also make a point of measuring progress along the way. A deliberate, systematic approach will bring about enduring improvements in data use, data maturity and sustainability-enabling factors.

Besides data directly related to and generated by Citizen Card implementation, a growing number of citizen data sets are generated every day in cities. This data has significant social, scientific and economic value for society. Unfortunately, current business models do not allow full access and use of this data, preventing local companies, academics, governments and citizens from participating in and benefitting from socially responsible innovation. The principles outlined below recognise data generated by citizens as a valuable public asset while preserving and reinforcing citizens' rights. Recognising the principles and adhering to them provides a sound basis for safely and effectively leveraging the existing data potential in cities.

**Table 17 – Public value principles for data**

Data principle	Explanation
<b>Citizen data as a public asset of and for each individual</b>	Citizen data must be recognised as a public and individual asset and shall be solely used in the public interest
<b>Public value</b>	Local governments recognise, support and adhere to the principle that use of citizen data generates tangible benefits for citizens and society. Using data-generated knowledge has the potential to improve our cities through scientific, civic, social, economic and democratic progress.
<b>Citizens as data guardians</b>	Governments have the responsibility to, and must, ensure citizens can have access to and manage their data, as well as influence how it is collected and used.
<b>Protection and privacy</b>	If citizen data contains personal data, the General Data Protection Regulation (GDPR) will apply. Storage, management, processing and use of data that involves privacy or safety risks should be done in accordance with the relevant EU and national legislation.

<b>Transparency and accountability</b>	Transparent, understandable and accountable measures on which, when, where and for what purpose data is sourced, collected and managed, should be put in place when generating data in public space. This includes both manual and automated methods, such as artificial intelligence and decision-making tools.
<b>Citizen data sharing and governance</b>	Anonymised data should be shared between relevant stakeholders with the common goal of maximising public value, subject to national and EU legislation. However, safeguards (e.g., synthetic data) must be identified and put in place to avoid, wherever possible, the risk of individuals or profiles being identified through use of new data analysis technologies (e.g., mining, use of Artificial Intelligence aggregation of data sets or data linking).
<b>Quality</b>	The quality of the data should be preserved. Those who use and share data have the responsibility to ensure the integrity, authenticity, consistency and accuracy of data.
<b>Interoperability</b>	The importance of data interoperability should be acknowledged and guaranteed through standardisation, open interfaces, open data models and open protocols to facilitate data sharing and re-use.
<b>Ethical and social responsibility</b>	Collecting and combining data may result in unforeseen insights about society or individuals. Parties collecting data in public spaces should ensure they regularly engage with citizens to investigate, discuss and agree requirements for any ethical consequences of data collection and, if necessary, adjust their practices accordingly.
<b>Local governments as connectors</b>	City governments are particularly suited to providing the connection between quintuple helix innovation ecosystems and the public and private data silos. They should be given the means to develop and expand city data stores (or knowledge bases) to facilitate this connection.

### 3.3.8.3 Adaptive management

Adaptive management requires realising that change happens and building in the ability to respond to the change. Emerging from the interdisciplinary need and understanding that complex development issues require nimble solutions, adaptive management calls for incremental, steady iteration. Adaptive management ensures that M&E plan outputs are continuously used to improve the Citizen Card

intervention. Adaptive management may include adjusting interventions, trying out new workflows, retiring unsuccessful processes or scaling approaches that have demonstrated value. It is a continuous process of learning by doing, receiving continuous feedback and ongoing stakeholder engagement. It uses cycles of structured decision-making and, increasingly, real-time data to make strategic and operational decisions throughout the implementation's life cycle.

Adaptive management is only possible to the extent that data on performance are available. So, collecting, processing and visualising data on the processes and performance of the Citizen Card implementation.

Real-time data empowered by Citizen Card interventions can facilitate adaptive management by enabling rapid, timely feedback in the form of behavioural changes, performance metrics and M&E indicators, allowing for prompt course correction. Adaptive management stimulates changes above traditional management approaches in several ways.

**Table 18 – Comparing traditional management and adaptive management**

Traditional management	Adaptive management
<ul style="list-style-type: none"> <li>Relies on fixed best practices and standardisation determined at the start of an implementation</li> <li>Change is top-down and driven by the organisation and donors</li> <li>Requires management planning and repetition</li> </ul>	<ul style="list-style-type: none"> <li>Reinforces participatory approaches, iteration and flexibility throughout the implementation life cycle</li> <li>Change is contextual and informed by end-users and other key stakeholders</li> <li>Requires the capacity for constant change and strategic course correction</li> </ul>

An ongoing cycle of decision-making, monitoring, assessment and feedback leads to a better understanding of development issues and an improved management strategy based on what is learned. Beware of how transforming the way data is used can generate resistance throughout all levels of the Citizen Card ecosystem because of changes in accountability, collaboration, communication, decision-making, job descriptions, and other operational practices. Although the Citizen Card may be functional, stable, usable and effective, this resistance can affect the overall efficacy of the intervention. Combining an effective monitoring approach with improved data-culture practices can help mitigate this risk.

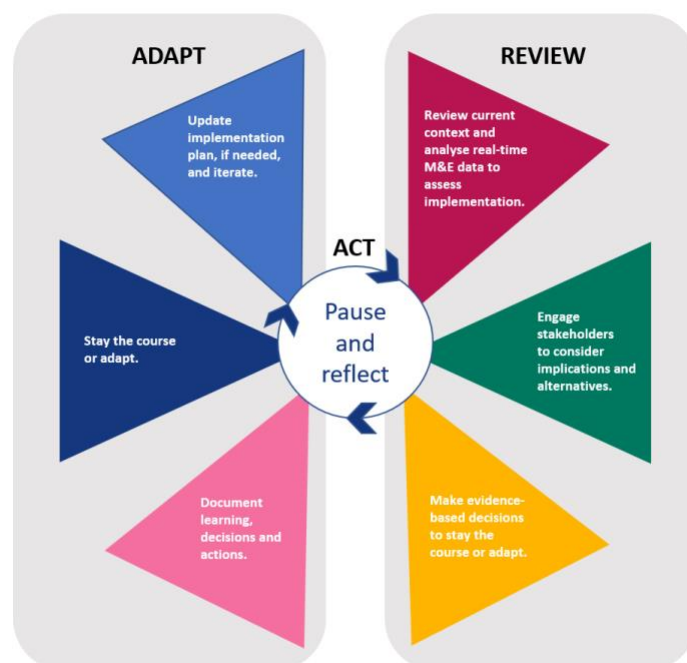
When developing your adaptive management plan to optimise and sustain interventions, consider the following questions:

- Are your programming interventions based on evidence or following a logical theory of change?
- How does your organisation identify and mitigate uncertainties and risks?
- Who is involved in decision-making at an implementation, project or organisational level?
- Which mechanisms do your team or organisation have to periodically pause and reflect on?
- How does your team or organisation discuss and learn from missteps or failures?
- Does your team have mechanisms for translating learnings into change? If so, how do you integrate change at an implementation, project or organisational level?
- Which tools and mechanisms does your team use to determine the appropriate approach to interventions (such as theories of change, benefit analyses, stakeholder analyses and so on)?
- How do you evaluate progress, taking into account uncertainties and repeated cycles of learning and change?
- How do you analyse and communicate results?

Throughout the process, document the learnings, considered alternatives, decisions and actions, as these may be used to inform future pause-and-reflect moments. If action has been taken to redirect,



schedule time to reassess the new plan and identify new areas where uncertainty may call for additional reflection. This is all part of the adaptive management cycle as shown below.



**Figure 12 - Adaptive management cycle**

### 3.3.9 Value proposition and next steps

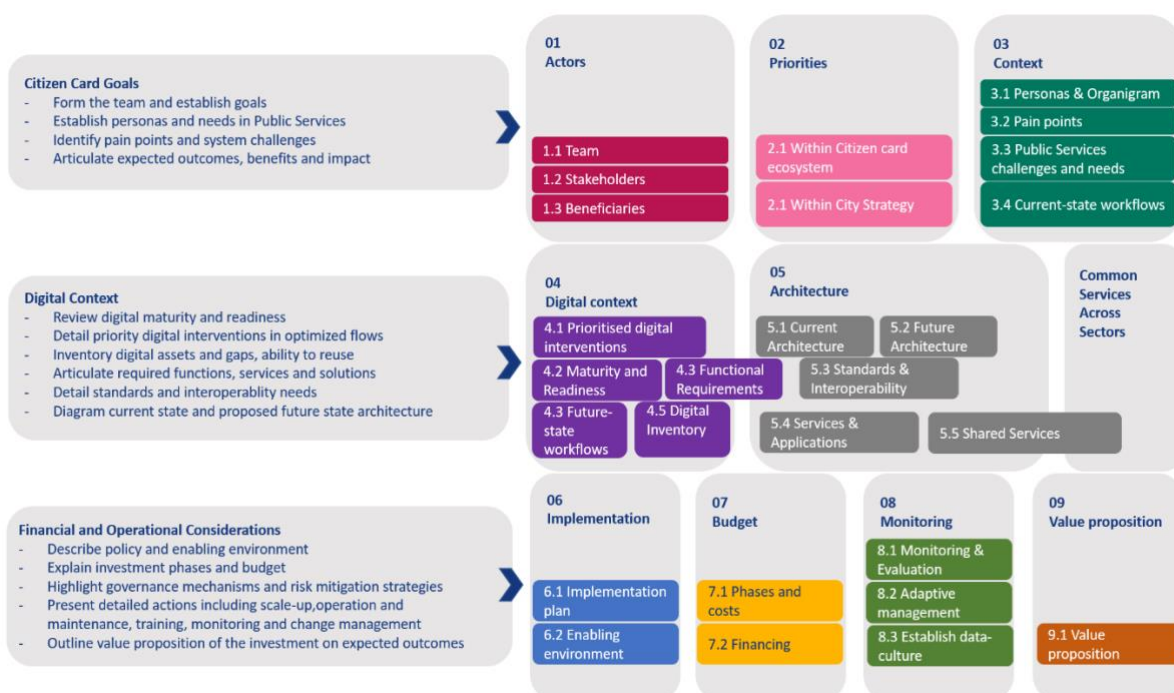
While the Citizen Card process takes time, it should result in long-term cost savings by reducing resources wasted on misaligned, ineffective or siloed public service architectures, while increasing the likelihood for impact by addressing identified public service challenges. Additionally, the selected interventions should fit within the existing city strategy, enterprise architecture and context, ensuring long-term sustainability of the investment. Lastly, as you embark on the Citizen Card implementation, continue to consider the evolution of the larger ecosystem. How can your investment continue to contribute to the broader ecosystem and the city? How can you use the data effectively to continually improve your investment and its impact? Remember that building sustainable digital endeavours is a dynamic process, and as the local context changes over time, you may need to consider new or additional interventions or refine your thinking on the Citizen Card ecosystem challenges to be addressed.

Beyond resource mobilisation, following this proposed Citizen Card process should give you more confidence that the selected interventions that you plan to implement within the Citizen Card architecture:

- Address identified bottlenecks and citizen needs
- Align with the existing city strategy
- Fit within your local context and ecosystem

Our proposed Citizen Card approach can be summarised within one visual.





**Figure 13 – Citizen Card Approach**

This report describes the approach for a white label Citizen Card. It can be used by all kinds of cities in Europe no matter their current situation. It gives embarking cities the insights needed to start building their own Citizen Card and experienced cities inspiration to transition to a more open, interoperable and scalable solution. As technology keeps evolving and local city contexts vary, the report focuses on the standards, principles and requirements on a generic level. The vision relies on a technology agnostic approach and an architecture that is based on components. These components can individually be replaced when there is better, faster, cheaper, safer or more secure technology available. The reason for introducing this technology agnostic approach is based on four main advantages:

1. Having a focus on the big picture and working with many partners.
2. Partners can develop solutions based on their own priorities.
3. Partners can be as tech-forward or backward-compatible as needed.
4. Building a team of social or economic problem solvers.

Following a technology agnostic approach means that as an organisation, you are unbiased towards the use of any specific technologies to solve your business problems. This approach is relatively new to governments and cities in general. However, it prevents the vendor lock-in legacy problems that many have seen in the last two decades. Creating Citizen Card related specifications and guidance on general principles leads to good service design. Providing standards on specific technologies can be restrictive and they can become quickly redundant. That is why the standards are deliberately technology agnostic, allowing to support cities today, tomorrow and the day after tomorrow.

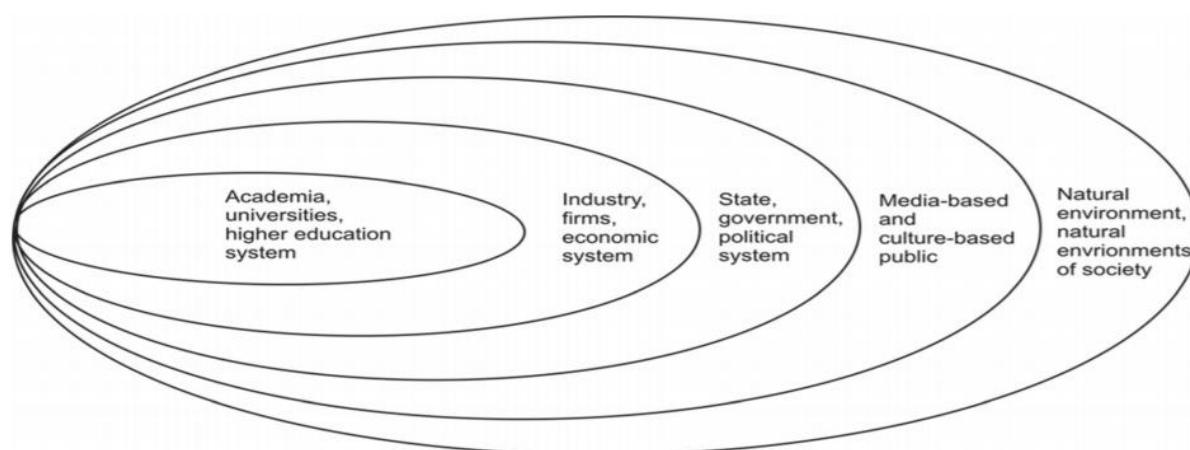
The proposed Citizen Card approach in this report allows for the implementation of a generic Citizen Card in many cities while connecting services. It allows a seamless integration within the public service domain of a city, providing citizens with increased usability and functionalities and helping cities reduce costs for development and deployment of services by re-using the Citizen Card building blocks.

## 4. Conclusions and recommendations

It is important to collaborate with local, regional, national and international partners in addition to having a vision of the technology, and the impact and effect you want to have with a Citizen Card.

This report concludes the first phase of the development of a white label Citizen Card development. The cities participating in the project want to continue this journey and work towards an implementable white label Citizen Card for all cities. For this, a 'Coalition of the Willing' is envisioned; a group of cities that further strengthens its partnership with Eurocities' Knowledge Society Forum and the Living-in.EU initiative to deliver a white label Citizen Card implementation. This coalition could form the heart of a quintuple helix ecosystem as described below.

A new Citizen Card ecosystem is required to be successful, supporting cities, their goals and the implementation of the white label Citizen Card. All stakeholders in society should be involved in such a system, based on the quintuple helix model<sup>20</sup>.



**Figure 14 – Quintuple helix model**

The quintuple helix encourages the perspective of the knowledge society, and of knowledge democracy for knowledge production and innovation. In a quintuple helix understanding, the sustainable development of a knowledge economy requires a co-evolution with the knowledge society. It emphasises the necessary socioecological transition of society and economy in the twenty-first century; therefore, it is ecologically sensitive. Within the framework of the helix innovation model, the natural environments of society and the economy also should be seen as drivers for knowledge production and innovation, therefore defining opportunities for the knowledge economy.

By introducing the model, expertise and experiences of all participants within the ecosystem is embraced and allows for leveraging their insights, expertise and resources. Such a network will thrive knowing it can build on the Citizen Card as a main vehicle for the transformation of cities and its services.

Furthermore, political and high-level local government commitment within cities is critical to guarantee success. A white label Citizen Card is an enabling solution to overcome many social,

<sup>20</sup> <https://innovation-entrepreneurship.springeropen.com/articles/10.1186/2192-5372-1-2>

economic and ecologic challenges when it is implemented and used correctly. It not only helps digitise society, but also supports financial inclusion due to our proposed user-friendly approach.

## 4.1 Next steps

As previously stated, a ‘coalition of the willing’ could form the formal governance for the next phase of a white label Citizen Card development. The CARD4ALL project – an URBACT project – could function as a next landing place of this initiative as it will be active until the summer of 2021. It provides participating cities with the possibility to keep collaborating, search for long-term partners and prepare the first proposals to receive funding for the next phase and further development.

The following steps are recommended to support further progress:

- 1) Develop a coalition of the willing comprising of the participating cities in this project, Eurocities’ KSF, interested cities, and Living-in.EU.
- 2) Further develop the white label Citizen Card (in collaboration with the Card4All project participants and Living-in.EU).
- 3) Monitor European funding opportunities and form consortia in partnership with Living-in.EU to prepare calls for funding schemes, such as Horizon Europe.
- 4) Create a citizen survey to assess the citizen needs in participating.
- 5) Determine which common services should be developed based on the citizen assessment. Implement these services subsequently based on the specifications developed.

## Annex – Funding our Future

There is a real momentum in Europe for cities to claim their role as ‘living labs’ in support of European policy and decision makers. Not only as a result of urbanisation, but it also stems from the need to create a new layer of trust between Europe and its citizens in local or regional areas. Cities can add societal value by providing high-impact products, services and support to their citizens and visitors.

There is a lack of understanding amongst EU citizens of how country-specific funding is distributed to support Member States when facing economic challenges. Withdrawing or reducing these funds would significantly reduce the speed of urban development in certain EU regions and cities. One can say that an EU citizen has many benefits, but this is a matter of perception depending on which country, region or city you live in. Many feel that they contribute to the EU’s economic growth, without receiving tangible support from their governments during trying times. It is more evident than ever since the corona virus pandemic.

A white label Citizen Card can help cities regain trust of their citizens by demonstrating efforts on a tool that will benefit every member of society. This is exactly what cities aim to do on a daily basis. Ideally, the European Commission would provide funding to recognise the effort put in by cities, coalitions and concepts which can have an enormously positive impact on citizens and businesses across Europe. Providing funding would help maximise their success.

The Citizen Card Project is a project with the potential to create a bridge between citizens, cities, countries and communities. The participating cities have shown an interest in moving forward with this project the coming years. They need resources to do it successfully. There are several European funding schemes which could help cities with their Citizen Journey. Possible funding streams are:

- Recovery fund<sup>21</sup>
- Horizon Europe<sup>22</sup>
- European Urban Initiative<sup>23</sup>
- Interreg<sup>24</sup>
- National grants
- Regional grants
- Joint Investment Plan

### Recovery fund

The coronavirus has shaken Europe and the world to its core, testing healthcare and welfare systems, our societies, economies, our way of living and how we work together. To protect lives and livelihoods, repair the Single Market and to build a lasting and prosperous recovery, the European Commission proposes to harness the full potential of the EU budget. The Recovery Fund of €750 billion as well as targeted reinforcements to the long-term EU budget for 2021-2027 will bring the total financial firepower of the EU budget to €1.85 trillion. Although Member States will receive these funds, they are required to deliberate with their constituting regional authorities in developing the National Recovery Plans. There are examples across Europe where States collaborate with cities and introduce icon projects in which all layers of government participate and commit to achieving a common goal, also across borders. Mostly focusing on health and well-being, energy transition, education and

<sup>21</sup> [https://ec.europa.eu/info/strategy/recovery-plan-europe\\_en](https://ec.europa.eu/info/strategy/recovery-plan-europe_en)

<sup>22</sup> [https://ec.europa.eu/info/horizon-europe\\_en](https://ec.europa.eu/info/horizon-europe_en)

<sup>23</sup> <https://ec.europa.eu/info/eu-regional-and-urban-development>

<sup>24</sup> <https://www.interregeurope.eu/>

(digital) enabling products and services such as a Citizen Card. These collaborations are financed by the funding received from the Recovery Fund. Cities are urged to partner up with their national governments. Either directly or via associations that represent the interests of cities.

## Horizon Europe

The Commission's proposal for Horizon Europe is an ambitious €100 billion research and innovation programme to succeed Horizon 2020. The Commission began a strategic planning process.

The result of the process will be set out in a multi-annual Strategic Plan to prepare the content in the work programmes and calls for a proposal for the first four years of Horizon Europe.

The strategic planning process will focus on the global challenges and European Industrial Competitiveness pillar of Horizon Europe. It will also cover the widening participation and strengthening the European research area programme, as well as relevant activities in other pillars.



**Figure 15 - Structure of Horizon Europe**

5 mission areas have been identified, each with a dedicated mission board and assembly. The board and assembly help specify, design and implement the specific missions which will launch under Horizon Europe in 2021.

- Adaptation to climate change including societal transformation
- Cancer
- Climate-neutral and smart cities
- Healthy oceans, seas, coastal and inland waters
- Soil health and food

Horizon Europe offers cities a chance – just like the previous Horizon 2020 programme – to work closely with the private sector, R&D entities and academia. The cities that are currently working on or are interested in the white label Citizen Card have a golden opportunity to form new concepts and coalitions in support of a Citizen Card and its use in society.

## European Urban Initiative

The European Urban Initiative builds on the previous results of the Urban Agenda. This initiative aims to strengthen integrated and participatory approaches to sustainable urban development and to provide a stronger link to relevant EU policies, in particular cohesion policy investments. It will do so by facilitating and supporting cooperation and capacity building of urban actors, innovative actions, knowledge, policy development and communication in the area of sustainable urban development.

To support cities and their challenges, the European Urban Initiative has created a value chain that will help to establish effective policy cycles by strengthening the policy feedback loop and creating more explicit links with investments on the ground funded by cohesion policy. At the same time, it will support evidence-based policy making in relation to urban matters on all levels.

According to Article 104(5) of the Common Provisions Regulation (CPR) proposal, the EUI will be allocated EUR 500 million ERDF (from investments for jobs and growth goal). The EUI will combine three main strands of activities (Article 10(2) ERDF/CF Regulation proposal). The below breakdown of the budget between the three strands is indicative. It takes into consideration the current envelopes of the URBACT Programme and the Urban Innovative Actions (UIA). It would be important to provide for budget flexibility to enable the EUI to adapt to the shifting needs.

- Support for capacity-building (20% of the budget) - **Strand a)** will foster a community of practice supporting urban practitioners and local stakeholders of cities of all sizes throughout Europe. (This strand is based on the current URBACT and Urban Development Network (UDN))
- Support for innovative actions (60% of the budget) - **Strand b)** will support experimentation in the area of sustainable urban development focusing on innovation in governance, strengthening the integrated and participative approaches, linking with the policy objectives of cohesion policy, EU policies and the objectives of the Urban Agenda for the EU. (This strand is based on the current Urban Innovative Actions.)
- Support for knowledge, policy development and communication (20% of the budget) - **Strand c)** will support the deepening and evidence-based demonstration of urban facts and policies in addition to capitalising and disseminating results of experiences and expertise “from the ground”.

For cities working on or interested in the white label Citizen Card it is important to understand that within the new Governance of EUI there are places available for city organisations and the Committee of the Regions. This means cities can directly influence the choices made and the work being done within the context of the European Urban Initiative. This could likely be an ideal platform for Eurocities to collaborate with city organisations like OASC and Living-in.EU, but also national associations or networks of cities and regions that support the individual cities.

## Interreg

Interreg Europe helps regional and local governments across Europe to improve policy. It creates an environment and opportunities for sharing solutions and policy-learning. It aims to make sure that government investment, innovation and implementation efforts all lead to integrated and sustainable impact for people and place.

With their 2021-2027 provisional programme Interreg wants to improve the implementation of regional development policies. The main objects for the coming years are:

- A smarter Europe
- A greener, low-carbon and resilient Europe
- A more connected Europe
- A more social Europe
- A Europe closer to citizens

As specified in the overall objective above, Interreg Europe targets regional policy actors. This target group includes national, regional and local authorities as well as other relevant bodies responsible for the definition and implementation of regional development policies. The composition of this target group is quite diverse, reflecting the diversity in institutional and geographical conditions in the Partner States. As a general rule, the beneficiaries of the programme are public bodies and bodies governed by public law. Private non-profit bodies may also be beneficiaries under certain conditions. Detailed



provisions will be outlined in the programme manual when finalised. Private companies, especially SMEs, are an important target group in the context of several supported specific objectives and when relevant they are encouraged to participate in the activities of Interreg Europe actions and benefit from the exchange of experience, although they cannot directly receive EU funding as a beneficiary.

As most of the Citizen Card projects are developed and implemented with local companies and SMEs, it would be a logical step that a consortium of cities will submit a proposal based on the white label Citizen Card in relation to creating a smarter Europe, a more social Europe and a Europe closer to its citizens.

## National and Regional grants

Besides the European funding opportunities cities sometimes overlook the possibilities in their own country or region. These kinds of 'local' funding programmes mostly support innovative ideas to help execute national or regional policies. This can be welcome grants to either match your own investments or start a new project with neighbouring cities.

## Joint Investment Plan

There are cities that combine their investment options through a Joint Investment Plan. Not only allocating their own budgets differently, but also reaching out to Europe and its institutions to 'claim' funding for large scale transitions in cities. These kinds of Joint Investment Plans are ignited by the '100 Climate neutral cities by 2030 movement'. The city of Zaragoza is the first to create such a detailed and impressive Joint Investment Plan and submit a proposal at the European Investment Bank.

To achieve in 10 years what Europe plans to achieve in 30 years is a huge challenge. This requires a systemic transformation of our cities. However, it is both necessary and feasible. It is necessary due to the current climate emergency and as the associated benefits will heavily impact citizens' wellbeing by possibly improving air quality, creating jobs, and/or promoting healthier lifestyles. It is feasible because technology and innovative solutions for healthy urban development, sustainable energy, transport, food, water and material systems are available – and more options will become available thanks to the support of Horizon Europe, national research and innovation initiatives.

Green technology prices and market conditions are moving in directions that favour climate-friendly investments. This will continue to strengthen incentives to make this transition. The European Green Deal, which prioritises a revision of EU climate legislation and targets for 2030 and foresees the European Investment Bank as a Climate Bank, will further strengthen this trend.

The following objectives for the mission on climate neutral cities are proposed:

- Support, promote and showcase 100 European cities making a systemic transformation towards climate neutrality by 2030. Making these cities experimentation and innovation hubs for all cities in the run to 2050.
- Offer cities financial means to achieve the mission goals through Horizon Europe, the European Structural and Investment funds, the Just Transition Fund, the Important Projects of Common European Interest, Invest EU and other EU instruments.
- Build a multi-level, co-creative process formalised through a Climate City Contract, to turn barriers - in particular innovation; governance; funding, financing and economic models; integrated urban planning; smart technologies and data - into drivers. This mission will be carried out by and for citizens, with a new role as change agents through bottom-up initiatives and innovation, especially through new forms of governance.
- Promote a just transition by helping to deliver the UN's Agenda 2030 and its Sustainable Development Goals to improve citizens' wellbeing by improving air quality, creating jobs, promoting healthier lifestyles and reducing the negative effects of mobility.

- Capitalise on existing European climate initiatives and stakeholders – such as the Covenant of Mayors, the European Institute of Innovation and Technology and its relevant Knowledge and Innovation Communities, the Green City Accord, the European Green Capital Cities, the Strategic Energy Technology Plan and its ‘100 Positive Energy Districts’ initiative, the European Innovation Partnership on Smart Cities.
- Collaborate with European businesses as a contribution to innovation and improve their global competitiveness. Climate neutral cities must also address climate adaptation and resilience through assessment of risks and vulnerabilities as a basis for their adaptation plans. The inclusion of adaptation in the Climate City Contracts will be further developed with the Climate Adaptation mission.

In this context you could see the white label Citizen Card as a ‘green’ card in many ways. It could function as a card to regulate waste management, measure energy use, reduce emissions by using public (electric) transport and so on and so forth. This Joint Investment Plan is a great way to transform your city and have a positive impact on the current and future generations.