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1 Introduction

1.1 Purpose of This Document

The purpose of this document is to present a concrete and useful roadmap for cities and city administrations in their journey towards a smart city and the implementation of smart city solutions using the European Platform for Intelligent Cities (EPIC). A general description is provided of the structures, concepts and objectives for this roadmap. For the concrete use of the roadmap, clear guidelines and user scenarios are described for city administrations and other relevant stakeholders. Furthermore, the detailed descriptions of the phases and disciplines are documented for the concrete application of roadmap.

1.2 How to Read This Document

This document represents the deliverable D6.3 Functional Roadmap as the result for task T6.4 of Work Package 6. Within this task, the roadmap description and templates are actually produced based on the results from the previous tasks T6.2 Stakeholder Interviews and Data Collection and T6.3 Creation of PM Framework to Become a Smart City.

This document on the EPIC roadmap for smart cities is organised in several main chapters:

- ***Chapter 3*** introduces the EPIC roadmap for smart cities including a general description for defining a smart city strategy and implementing smart city services using EPIC;
- ***Chapter 4*** provides the detailed descriptions for the phases and disciplines of the EPIC roadmap. For each phase, a detailed description is provided of the objective, the tasks, roles and responsibilities, and work products. Furthermore, concrete templates are indicated (and provided separately) for a set of work products that are identified as most specific for developing a smart city strategy and implementing smart city solutions using EPIC;
- ***Chapter 5*** provides concrete guidelines for the actual use of the EPIC roadmap by city administrations, SMEs, EPIC platform providers, or other relevant stakeholders. These guidelines should enable any city in initiating and successfully concluding an implementation project for an EPIC service.

In Annex I, the list of references that are used to construct this functional roadmap for cities is provided. In Annex II, the abbreviations used throughout this document are listed and described.

Next to this document D6.3, the concrete templates and materials for the application of the EPIC roadmap can be found in the separately provided documents, as part of this Annex III. As part of the document D6.3, these templates are made available to the relevant stakeholders on the EPIC public website. The provided templates for the different phases in the EPIC roadmap include the following:

- Template 1: Vision Phase – EPIC Smart City Strategy
- Template 2: Vision Phase – EPIC Smart City Business Case
- Template 3: Vision Phase – Change Management Roadmap tool
- Template 4: Plan Phase – EPIC Project Charter
- Template 5: Plan Phase – Project Management and Quality Plan
- Template 6: Design Phase – EPIC Service reference design
- Template 7: Design Phase – EPIC Overall test approach
- Template 8: Build Phase – EPIC Service release readiness
- Template 9: Deliver Phase – EPIC Service cutover and deployment plan
- Template 10: Operate Phase – EPIC Service provisioning

1.3 Context of Smart Cities

Notwithstanding the enormous formidable challenges and disadvantages associated with urban agglomerations, the world population has been steadily concentrating in cities. In addition, the average size of urban areas substantially increased over the past decades. As indicated by the United Nations, just over half the world now lives in cities but by 2050, over 70% of the world will be urban dwellers. By then, only 14% of people in rich countries will live outside cities, and 33% in poor countries.

This evolution has been made possible by a simultaneous upward shift in the urban technological frontier, so that a city could accommodate more inhabitants. Problems associated with urban agglomerations have usually been solved by means of creativity, human capital, cooperation (sometimes bargaining) among relevant stakeholders, and bright scientific ideas: in a nutshell, 'smart' solutions. The label 'smart city' should therefore point to clever solutions allowing modern cities to thrive, through quantitative and qualitative improvement in productivity.

Consistent evidence (see 2004 Urban Audit data set[1]) has been found of a positive association between urban wealth and the presence of a vast number of creative professionals, a high score in a multimodal accessibility indicator, the quality of urban transportation networks, the diffusion of ICTs (most noticeably in the e-government industry), and, finally, the quality of human capital. These positive associations clearly define a policy agenda for smart cities, although clarity does not necessarily imply ease of implementation.

In recent years, the concept of 'smart city' has been widely used by cities and commercial organisations to communicate and promote different types of initiatives or solutions in a city context. Especially in the policy arena, the concept of 'smart city' has been quite

[1] See Eurostat on Regions and Cities (http://epp.eurostat.ec.europa.eu/portal/page/portal/region_cities/city_urban)

fashionable. As a result, there are various definitions for what a smart city is or which characteristics define a city as being 'smart'.

For smart cities, the main focus seems to be on the role of ICT infrastructure, although much research has also been carried out on the role of human capital/education, social and relational capital and environmental interest as important drivers of urban growth. An important focus will be on combining institutional, human and technology enablers in key domains for forward-looking and sustainable urban development.

As a narrow definition, a city is believed to be smart when investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance.

As defined in the EPIC Project Vision, EPIC believes that a truly 'Smart City' is one that is able to:

1. Benefit from the innovative developments of citizens, SMEs and other actors from across Europe rather than just within their own cities.
2. Leverage a service infrastructure that is capable of delivering 'one-stop-government' through the integration of services, interoperability of systems and use of actionable intelligence in service delivery.
3. Contribute to a federation of service-oriented ecosystems by providing and sharing open business processes as services with other cities.

For the different regions in the world, it is clear that there are different needs in the various types of cities. First, there are big differences in the size of cities, going from smaller communities to regional cities and capitals, and to the mega-cities. Second, there are differences in the development of the city itself. Here we can identify different types of cities, according to the phase of development that they are in:

- **Legacy cities** are large and established cities that are confronted with an aging infrastructure and have a stable population (possibly sustained by immigration). The challenges for legacy cities are to maintain the high levels of social infrastructures and citizen welfare, and to fund the infrastructure upgrades.
- **Transitioning cities** are large and established cities that are undergoing rapid urbanization and population growth, and are typically situated in Africa, South-America and South Asia. The challenges for transitioning cities are to develop strategic plans and funding, and to implement and provision the infrastructures.
- **New cities** are mostly centrally planned cities in Asia, China and the Middle East. The challenges for new cities are to improve the life cycle of procurement of a city, going from funding structures, regulatory control, design, construction and operations.

As described in the paper 'Smart cities in Europe' [3], urban performance currently depends not only on the city's endowment of hard infrastructure ('physical capital'), but also, and increasingly so, on the availability and quality of knowledge communication and social infrastructure ('intellectual capital and social capital'). The latter form of capital is decisive for urban competitiveness. It is against this background that the concept of the smart city has been introduced as a strategic device to encompass modern urban production factors in a common framework and to highlight the growing importance of Information and Communication Technologies (ICTs), social and environmental capital in profiling the attractiveness of cities.

1.4 EPIC as Solution Platform for Smart Cities

The European Platform for Intelligent Cities (EPIC) project aims at creating the first truly scalable and flexible pan-European platform for innovative user-centric public service delivery by combining innovation ecosystem processes, fully researched and tested eGovernment service applications with a new cloud computing paradigm. The resulting overall vision for EPIC can be defined as follows:

> *"To be the first choice service innovation and delivery platform (with Roadmap) for medium-sized (50.000–500.000 habitants) cities across Europe, where any of these cities can cost-effectively share, access and adapt a range of services to work smarter to meet the needs of most, if not all, their citizens, visitors and a wide range of business/social relations".* [2]

The EPIC project will encourage city administrations / decision-makers and Small and Medium Enterprises (SMEs) to take up the EPIC platform approach through the adoption of a practical, business-tested roadmap for implementation. In addition, a catalogue of innovative services and solutions (such as smart electricity, water and transport grids) can help European cities to upscale from the Living Labs environment in designing specific services and solutions for real-life urban deployment.

Unlike a typical cloud infrastructure platform (which is normally just a collection of virtualized servers and storage), EPIC is primarily driven by the need to govern business rules, security and authentication protocols – making it easier and more efficient for public administrations to harness the innovative potential of Living Labs and other eGovernment advancements across Europe to deliver state-of-the-art public services on a pan-European scale. [1]

[2] See Deliverable D2.1 Project Vision

As such, EPIC wants to be a European 'innovation ecosystem' that provides an extensive range of opportunities to deploy sustainable, user-centric services for citizens and businesses in order to enable European cities to become smart. The two main target groups are (1) Cities and their Living Lab partners and (2) Citizens and Businesses either located in or visiting a city. User-centric open innovation, connected smart cities and web services are combined in EPIC in the following manner:

1. **Partner Living Labs** engages citizens and SMEs in the innovation process to help drive creation of the type of standard-based web services that citizens, businesses and city visitors want and are potentially willing to pay for,
2. **Partner cities** will work to plug existing and new co-designed web services into EPIC so that other cities can connect to the platform, discover and use them,
3. **Partner consultants and subject matter experts** can use findings from pilots and prototypes to help refine the roadmap that incorporates a variety of relevant business models from open source, to pay-per-use and licensing models.

The primary focus of EPIC is promoting smart city services through the use of a Smart City services catalogue. This catalogue enables cities to find, select and offer already developed web services or select the web services they need in the innovative creation of new ones. A smart city portal is hosted through which end-users will consume the smart city services that are being developed.

The value of EPIC for the different stakeholders could be described as follows:

- **City Administrations:** Through the roadmap, EPIC breaks down existing barriers by enabling city administrations to obtain IT services in very small increments and with flexible conditions (i.e. on a pay-as-you-go basis). The ability to buy IT services in smaller increments could potentially help all administrations, but will be especially beneficial for smaller cities. The EPIC model allows for cloud consumption models to enable access to IT solutions that would not be otherwise economically possible;
- **Small and Medium Enterprises (SMEs):** The EPIC platform can offer several advantages for SMEs that develop commercial web services. EPIC bears an immediate value proposition not only for the SMEs in the consortium, but to all SMEs within the Smart City portfolio. Because EPIC offers easy and low-impact/cost on-boarding and integration services as well as provisioning and orchestration for various tools and capabilities, it can provide otherwise unaffordable benefits for SMEs. In particular, EPIC eases the go-to-market path for SMEs as the cloud web services platform virtualises the underpinning infrastructure, management framework and governance policies for security and regulatory compliance which apply in the network-enabled, cross-domain and cross-border environment;
- **Citizens and Businesses:** The citizens living in or visiting the city will gain from accessing more innovative, user-centric, efficient and effective services through the smart city portal in EPIC. Even citizens can drive the development or provision of specific smart eGovernment services in Smart Cities. Businesses (including the larger and international companies) are operating within or are doing business in different

cities and will also gain from accessing these smart eGovernment services in driving their economic value.

One of the major outcomes of the EPIC project is the development of a business focused roadmap to be used as a guide for a pan-European exploitation of EPIC. The roadmap will cover the important aspects and will describe the required steps for a successful adoption of EPIC by European cities (i.e. city administrations) and SMEs, including possible strategies, business cases, business models and key building blocks (such as identity, security, multiple-modal access and authentication).

By providing a comprehensive project management framework and business case template, the EPIC roadmap aims to achieve the following objectives:

- Detail the fundamental principles involved in becoming a Smart City;
- Describe working business models for city administrations and SMEs, including criteria for partnership selection as well as contract management and intellectual property rights (IPR) related issues;
- Outline best practices for organisational change and stakeholder management that should help cities in their transformation towards smart city services;
- Elaborate on the requirements and process elements for offering these smart city services using the EPIC platform;
- Elaborate on the value, usefulness, accessibility, and security of information assets that are integrated in the smart city services;
- Detail the approaches and building blocks for designing, developing, testing and operating the technical systems and services on the EPIC platform.

As was indicated in the communication from the European Commission on 'Unleashing the Potential of Cloud Computing in Europe' (COM(2012) 529 final)[3], the key areas where actions are needed included the fragmentation of the digital single market, problems with contracts, and a jungle of standards. These areas are taken into account for the development of the EPIC roadmap.

The EPIC roadmap provides a deployment guide that indicates how a Smart City can transform and evolve services (e.g. eGovernment services) and deliver them through the EPIC platform.

[3] See communication from European Commission (http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2012:0529:FIN:EN:PDF)

2 Overview of EPIC Roadmap for Smart Cities

The objective of this chapter is to provide a first overview of the EPIC roadmap for smart cities, including the overall steps and actions, the defined operational model for EPIC and the involved stakeholders, roles and responsibilities. In general, a roadmap is an action plan describing a planned series of actions, tasks and steps designed to achieve an objective or goal.

For a city, the EPIC roadmap describes the planned series of actions, tasks and steps in becoming a 'smart city'. In recent history and even in current situations, the smart city initiatives that were defined and implemented were often not structured, coordinated or integrated in an overall strategy and approach. This EPIC roadmap will help city management, administrations and related stakeholders in actually improving their efforts and creating a better managed and integrated approach for evolving towards a smart city.

2.1 Overview of Steps in EPIC Roadmap

In elaborating the main steps, six phases are identified for the EPIC roadmap that will help cities in developing a smart city vision, define concrete project plans, implement (i.e. design, build and deliver) and finally operate the smart city services. For each of these phases, concrete results need to be documented in order to take a decision for moving to a next phase. An overview of the different steps and objectives in the EPIC roadmap for smart cities is provided in Figure 1.

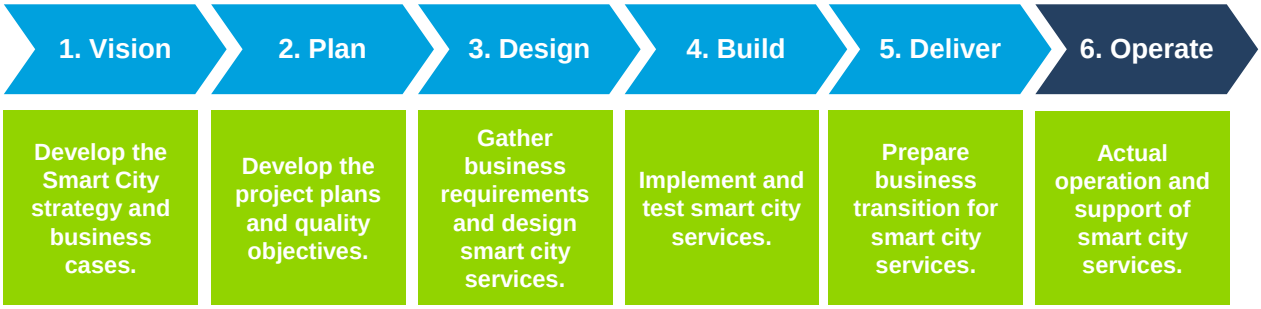


Figure 1 - Introducing the EPIC Roadmap Objectives and Results

The EPIC roadmap for smart cities starts with the development of a smart city strategy. Based on this strategy, the concrete goals and objectives are defined to be achieved by the city in a specific time period. The strategic actions and plans are developed for achieving these objectives, which would result in the definition of concrete business cases.

Based on the strategic actions and plans, the concrete project plans need to be developed for their actual implementation. These project plans could include different type of smart

city solutions, for example establishing a legal framework or implementing smart city solutions in a cloud environment (e.g. EPIC services).

An EPIC project is a project undertaken by a city or city administration to take up the EPIC platform to develop, transform and improve smart city services in order to become a smart city. The project management framework for the roadmap provides a method for cities or city administrations to manage an EPIC project, from designing to building and delivering the smart city solutions.

Finally, the smart city solutions need to be operated and supported for their use by end-users (e.g. citizens or businesses).

As previously described, the phases of the EPIC roadmap represent the progression of key activities in the project life cycle. These activities can be further elaborated and grouped, based on the roles and responsibilities or expertise that is necessary to perform them. As a result, these activities can be grouped into specific disciplines. These disciplines reflect specific themes of expertise that span the different phases of the EPIC roadmap. Within the roadmap, each discipline consists of tasks that are performed by specific roles and that produce concrete work products.

An overview of the phases and disciplines for the EPIC roadmap are provided in Figure 2 and are described in the following sections.

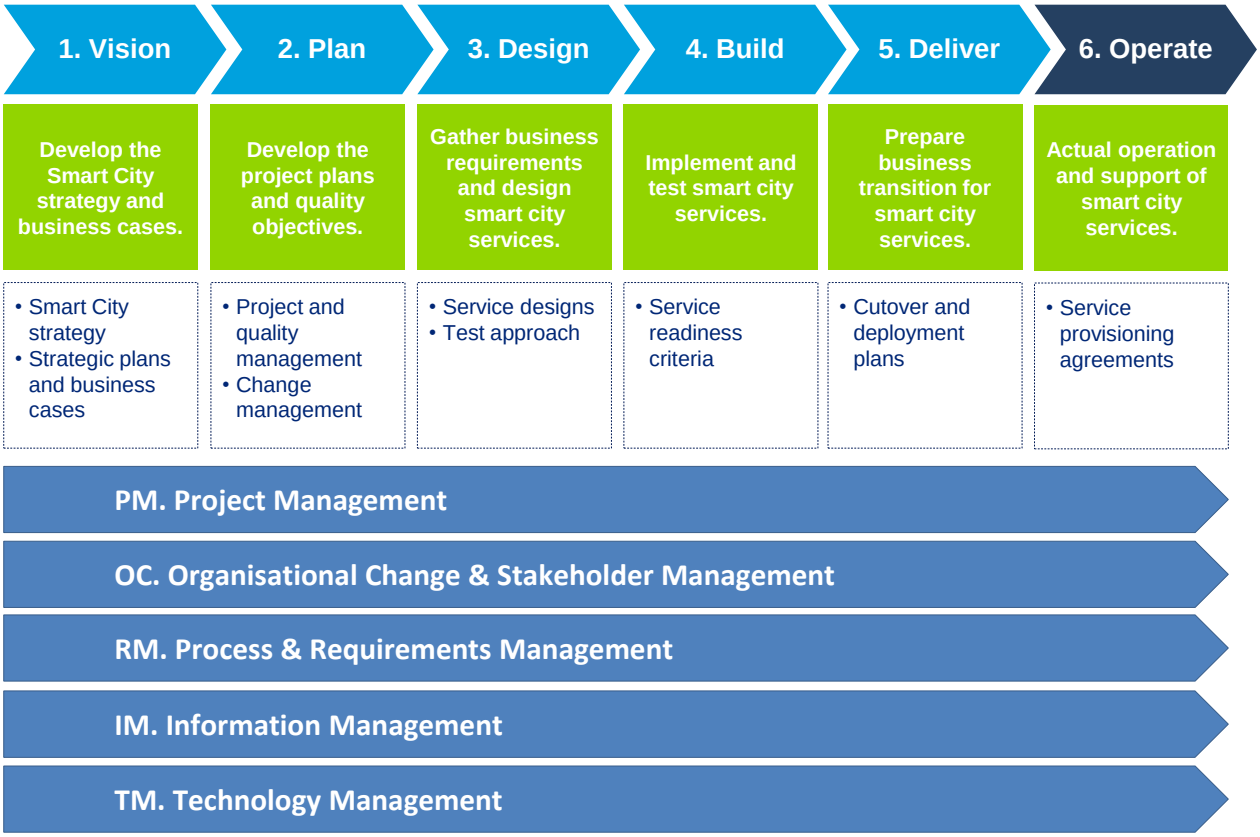


Figure 2 - Overview of Phases and Disciplines for EPIC Roadmap

The different phases in the EPIC roadmap are described as follows:

- In the **Vision (1) phase**, the smart city strategy is developed by the city administration and relevant stakeholders, using a specific framework and maturity model for smart cities. Based on this strategy, the concrete goals and objectives are defined to be achieved by the city in a specific time period. The strategic actions and plans are developed which would result in the definition of concrete business cases that will highlight the benefits, potential risks and financial impact.
- In the **Plan (2) phase**, the concrete project and programme plans are developed for the business cases and strategic objectives. The project definition, budget and master plan are developed in order to clearly define the goals and expected benefits, as well as describing the project approach, scope, and key milestones. The project management plan is developed for the implementation of smart city services on the EPIC platform, and includes for example the project organisation, scope, risks, issues, change requests, and budget. A quality management plan is defined to address the project's quality objectives and activities for quality assurance, control and support.
- In the **Design (3) phase**, the business requirements are documented and a detailed design for the smart public services is created. In order to create a design, the business processes, software configuration, software gaps, change impacts,

application security, and technical infrastructure are taken into account. A proof of concept prototype (or an initial mock-up) is developed to show how the city administrations and citizens/businesses will operate and use the smart city services on the EPIC platform. The proof of concept prototypes will mostly be developed in a living lab context.

- In the **Build (4) phase**, the smart city services are implemented based on the design and using the EPIC platform. The testing of the smart city services is performed as is defined in the test management plan. Furthermore, end-user training materials and user guides are developed.
- In the **Deliver (5) phase**, the business and system transition to the operations environment are prepared and executed. This includes conducting user-acceptance testing, performing end-user training, conducting go/no-go evaluations and establishing the support organisation to help the city administrations after transition.
- In the **Operate (6) phase**, the activities are performed for actually transitioning, operating and supporting the smart city services into actual business operations.

The specific disciplines included in the EPIC roadmap are described as follows:

- **Project management (PM)** provides the approaches and assets for effective project planning and management, corresponding to general project management methodologies. Quality management defines tasks to plan and monitor project quality, control and confirm work products, and assess project processes and standards.
- **Organisational change management (OC)** addresses adoption and sustainability of the change initiatives, both within the city administrations and towards relevant stakeholders. It encompasses an integrated approach to communications, stakeholder engagement and preparation, training, and organisational alignment and transition.
- **Process and requirements management (RM)** addresses user requirements definition and management, business process design and controls, software development, functional testing, and business continuity planning.
- **Information management (IM)** addresses the value, usefulness, accessibility, and security of the data and information assets at the city administrations. It includes tasks related to data and information requirements management, standards, and security and controls.
- **Technology management (TM)** defines the approach to design, develop, test, and operate the software and infrastructure components required for the smart city services.

2.2 Proposed Operational Model for EPIC

For smart cities, the EPIC platform provides the necessary infrastructure and platform for the efficient implementation and delivery of smart city services. For relevant stakeholders to better understand and use this innovative ecosystem for smart cities, it is necessary to describe first the overall structure and operational model for such an EPIC platform. As shown in Figure 3, a high-level overview of the operational model for EPIC is proposed including the different entities, components and relationships.

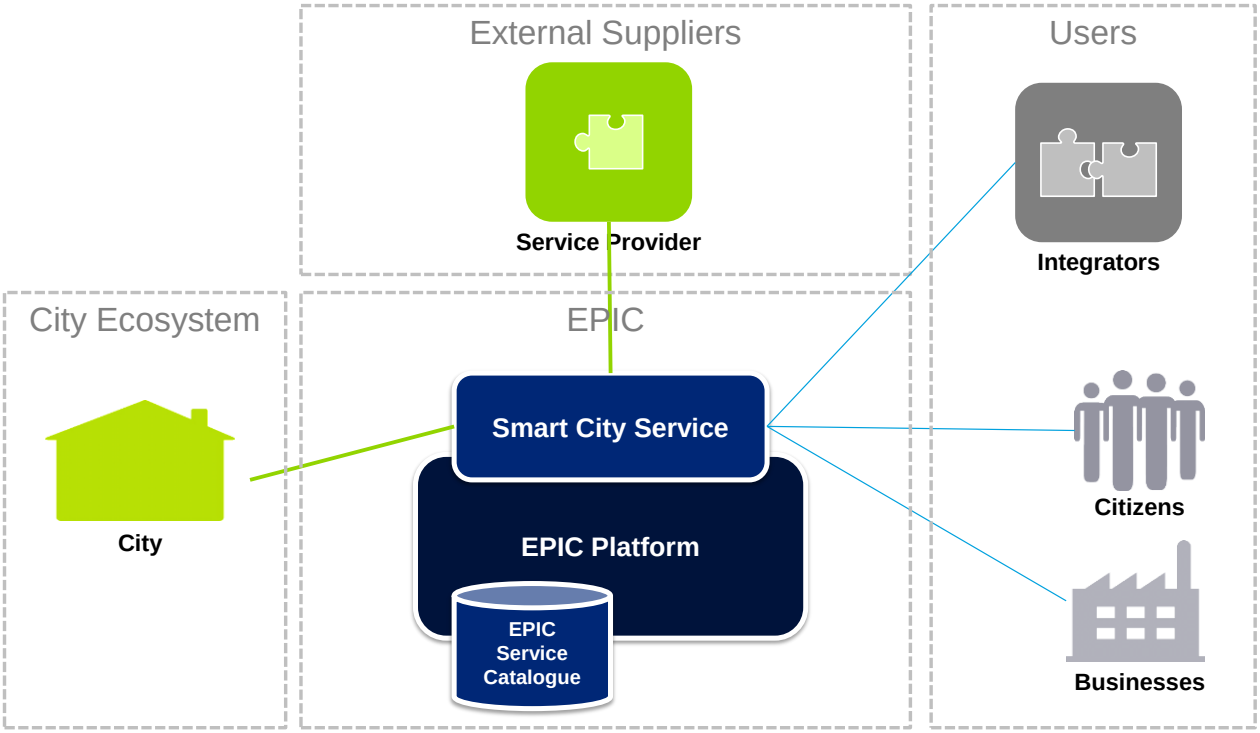


Figure 3 - Overview of Operational Model for EPIC

In this proposed high-level operational model for EPIC, the added value to end-users is provided by the smart city services that are available on the EPIC platform. This platform and services operate as a cloud computing model, enabling ubiquitous, convenient, on-demand access to rapidly provisioned and configurable infrastructures and computing resources. As such, cloud computing represents an important change in the way information services are delivered, based on wide use of internet standards and virtualisation. For EPIC, cloud computing is identified as a disruptive innovation for providing products and services within local governments, and leveraging them globally in order to increase the value provided within the city itself and in other cities.

As EPIC provides a concrete platform for operating smart city solutions, it is necessary to explain potential service models related to such a platform. In the EPIC operational model, a

cloud computing platform is proposed for the EPIC platform for which different service models could be described. In general, the following service models are identified for cloud computing platforms:

- **Infrastructure as a Service (IaaS)** – Provides customers with storage capacity and database services on a cloud infrastructure through a subscription service with direct operational control. (e.g. Amazon EC2);
- **Platform as a Service (PaaS)** – Provides customers with a platform for them to load and run software through a subscription service, without visibility to the underlying server environment. (e.g. Google App Engine);
- **Software as a Service (SaaS)** – Provides customers with operational software applications that run on a subscription basis, with no software license, and limited operational control. (e.g. Salesforce.com or Google Gmail service).

In understanding these service models, the EPIC platform is delivered in a PaaS service model that could be used by service providers and/or city operators for establishing smart city services that are then delivered in a SaaS service model. In delivering a cloud platform and services in the context of smart cities, it is further necessary to define the specific scope and breadth of such an EPIC platform. Different delivery models could be defined for a cloud platform, including the following:

- **Public Cloud** – Provides a scalable and virtualised computing service (provided by a third party) that could be used by multiple customers and accessed across the internet or private networks.
- **Virtual Private Cloud** – Provides a scalable and virtually private computing services (provided by a third party) that could be accessed via dedicated but private links to the public cloud (as being segmented or secured for the client).
- **Private Cloud** -
    - The cloud infrastructure is provisioned for exclusive use by a single agency comprising multiple consumers (e.g., business units). It may be owned, managed, and operated by the agency, a third party, or some combination of them, and it may exist on or off premises.
    - Usually internal and delivered on client premises (although can be hosted by third-party provider)
    - Only used by internal customers
    - Scalable but with elasticity constraints
    - Access via private link or internal
    - Exclusive membership
    - Spectrum of control / ownership
- **Community Cloud**
    - Community clouds are used across departments or state agencies, allowing for collaboration among a community of interest.
    - As per private cloud but shared infrastructure resources with “communities” or groups with similar requirements (e.g., industry peers)

- **Hybrid Cloud**
  - A mixed environment with both public and private cloud services; includes "virtual private clouds"
  - Mix of private and public cloud environments (e.g., data stored in private premises but other infrastructure shared in public cloud)

In concluding on the proposed operational model for EPIC, the EPIC platform and smart city services would be delivered respectively in a PaaS and SaaS delivery model as part of a community cloud. In adopting cloud computing and using the EPIC platform (as PaaS) and smart city services (as SaaS), the main drivers and benefits for smart cities can be summarised as follows:

- **Seeking leadership and innovation:** Cities may seek to be seen as innovative and leading in a constant changing world by using the most innovative technologies and delivery models. The existing smart city services available in cities could be leveraged and improved towards a wider range of cities, through the use of the EPIC service catalogue.
- **Facilitating economic growth:** Cities would facilitate the establishment of new (or expanding existing) products and services in the private or social sector, that could add and support more customers and increase the value provided.
- **Changing delivery models:** Cities could leverage different delivery models (e.g. financial options) and technologies in providing the products and services to different customer segments.
- **Openness of governments:** Cities act as more local service providers towards citizens and businesses and collect a wide range of data and information from various sources. As local governments, smart cities can more easily accommodate the general requests from the public on more transparency and openness of governments and public institutions.

In the following sections, three important aspects for the operational model for EPIC are discussed. First, the specific technology and standards are discussed that are currently used for the establishment of the EPIC platform and smart city services. Secondly, the management of the service catalogue is discussed that will provide both a business and technical overview of the different smart city services available on the EPIC platform. Thirdly, the different stakeholders for the operational model of EPIC are identified and described as well as their specific roles and responsibilities.

2.2.1 Technology and Standards for EPIC Platform and Services

The first technology to be discussed relates to the access and integration of different data sources within the EPIC platform. The current platform supports in particular the SOAP standard (by W3C)[4] for webservices that are used for providing access to data services. This SOAP standard uses the XML format for requesting and receiving information between different IT systems, in particular webservices. However, for the mobile applications, the REST standard[5] is preferred over the SOAP standard for making webservices available.

To develop the smart city services on the EPIC platform (as is shown in Figure 4), the main technology of portlets is used that can be deployed on the platform environments. As such, a portlet factory ensures the development and deployment of the relevant software functionalities.

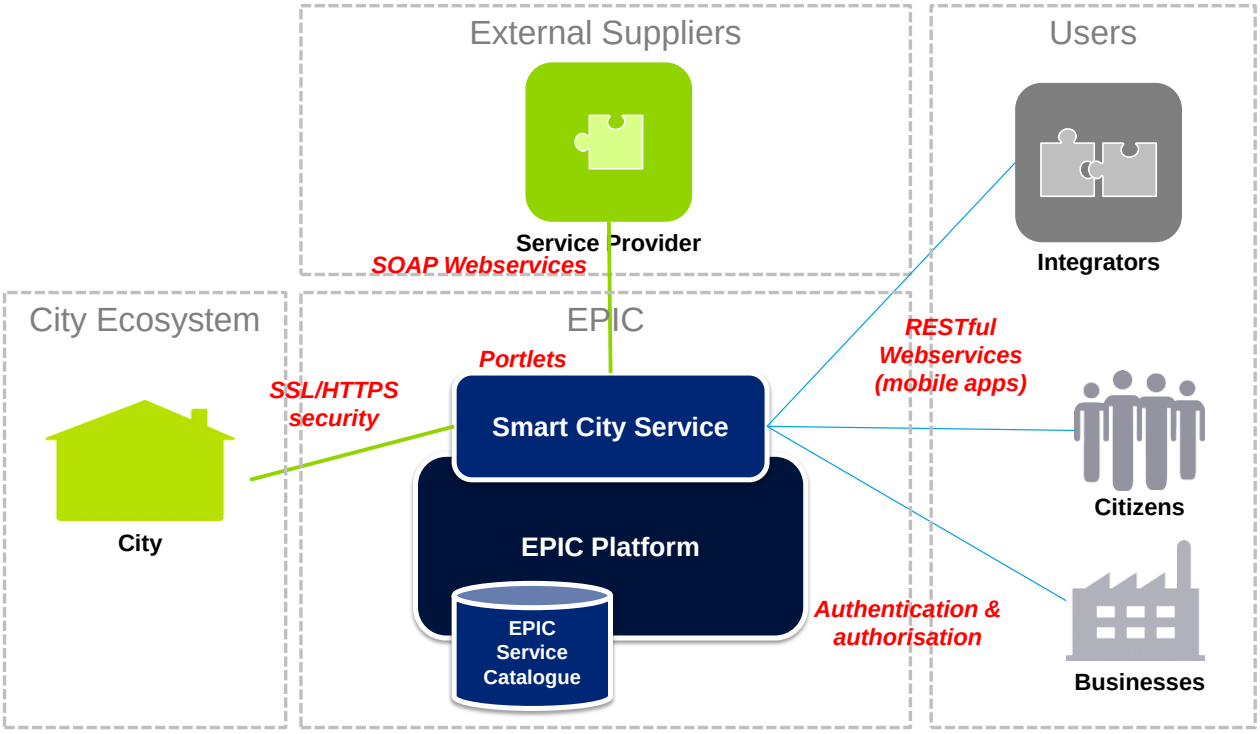


Figure 4 - Overview of Technologies and Standards for EPIC Platform and Services

For the security aspects of the EPIC platform, there are currently limited encryption or security measures applied for the access to external data sources from city administrations (e.g. the points-of-interest data from CIBG). To a large extend, these data are considered as

[4] See reference to SOAP standard from W3C (http://www.w3.org/TR/soap/)
[5] See reference to RESTful webservices on Wikipedia (https://en.wikipedia.org/wiki/Representational_state_transfer)

'open data' and are made available to the general public through webservice technologies. However, specific security measures (e.g. SSL encryption and authentication mechanisms) are being applied for the integration of data streams from private businesses (or other organisations). For the access through mobile applications, the RESTful services apply both HTTPS security encryption and authentication measures.

In discussing the user identity and access control for the EPIC platform, this is currently performed as part of the platform components (i.e. IBM WebSphere components). The users of the smart city services would be able to register and access these EPIC services according to the specific conditions defined for each service. These access controls can be managed and adapted by the platform administrators and the particular service providers.

2.2.2 Service Catalogue Management for EPIC

In the current digital era, online consumer-oriented catalogues like online bookstores, iTunes, and eBay are becoming more and more important in connecting and delivering services and products to consumers. Next, we have more and more online business-oriented catalogues for things like electronic components and industrial parts. A catalogue is published online to make it easier for customers to search and learn what products and services are being offered, at what cost, and how to order them.

In general, the IT standard for service management – ITIL3 (formerly known as the Information Technology Infrastructure Library) defines the service catalogue as:

- A database or structured document with information about all live IT services, including those available for deployment;
- Part of the service portfolio published to customers;
- Used to support the sales and delivery of IT service;
- Including information about deliverables, prices, contact points, ordering, and requesting processes.

A service catalogue for EPIC provides the cornerstone for delivering and managing the smart city services currently available on the platform. It will provide the starting point for any city administration, SME or other service integrator to investigate the possibilities of the platform and to leverage already existing smart city services. In concrete sense, the EPIC service catalogue provides the structured information about all operational EPIC or non-EPIC services, including those available for deployment.

The service catalogue is part of the service portfolio and contains information about two types of services:

- Customer-facing services that are visible to the business;
- Supporting services required by service providers to deliver customer-facing services.

The benefit for customers is that a service catalogue lists all of the services currently available and allows requests for specific services. In this way, the service catalogue performs a useful function as customers can request services themselves, which alleviates

some of the pressure on the service desk and will realise significant time savings. For customers, they receive an easily understandable view of the catalogue and can be proactive in their requests. As such, we have to consider the two inherent parts of a service catalogue and the description of smart city services: a business part and a technical part.

For the service providers and external integrators, a service catalogue defines the services that are available and delivered to customers. A service catalogue allows the service provider or external integrators to carefully define and select the available services and ensures there are the correct processes and procedures in place to deliver services to customers. It provides the basis for managing and monitoring the service delivery that is aligned directly to the customers' needs and the smart city strategy.

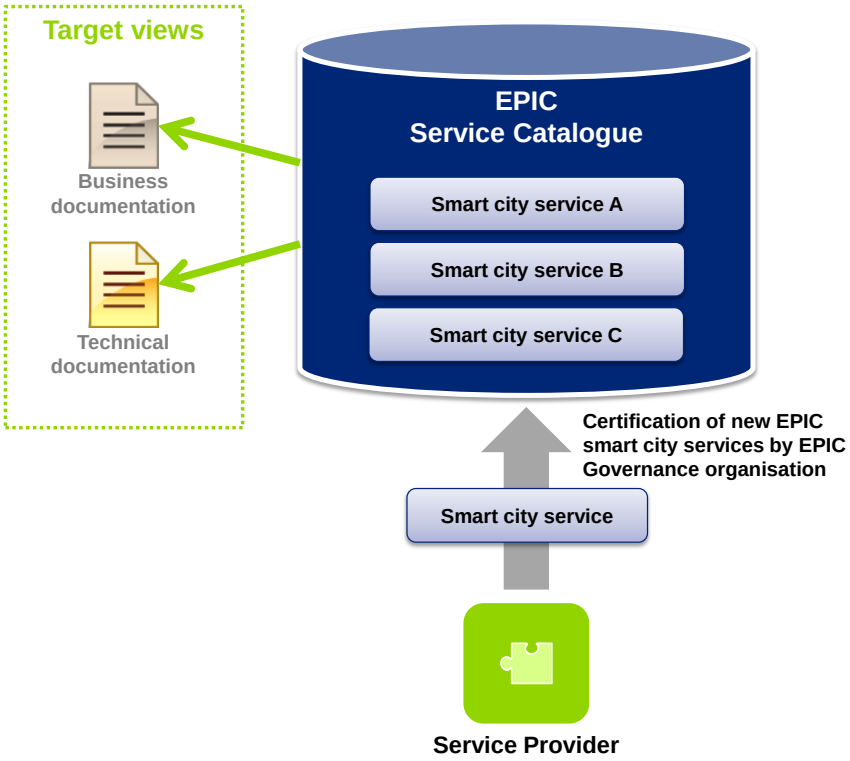


Figure 5 - Overview of the EPIC Service Catalogue Management

For implementing a service catalogue for EPIC, it is important to understand the different processes to be performed and the roles and responsibilities of stakeholders involved. An overview of the management aspects for an EPIC service catalogue is shown in Figure 5. These include the evaluation and certification of new smart city services within the catalogue, the maintenance and update of existing services within the catalogue and the publishing of information towards target audiences.

For the EPIC service catalogue, the information on smart city services is published in two ways:

- The **business documentation** should be established as an online web store that all (potential) users, such as for example city management, SMEs in the city or other businesses, can visit to discover and evaluate any smart city service;
- The **technical documentation** should be integrated in the EPIC platform and will be viewed and used by city administrations, service providers or other stakeholders in the technical integration and management of the smart city services on the EPIC platform.

For the population of the service catalogue, new smart city services are being developed and transitioned towards the EPIC platform and certified within the EPIC service catalogue. For certifying new EPIC services, the EPIC governance organisation will evaluate both the business value towards smart cities and the technical implementation on the EPIC platform (e.g. using the defined standards and performance requirements). The service owners will provide the detailed information and conditions (e.g. service levels, pricing models, dependencies, etc.) for using and integrating their specific smart city service on the EPIC platform.

The main responsible actors for the set-up, maintenance and governance of the EPIC service catalogue will be the overall EPIC consortium and the EPIC governance organisation. This EPIC governance organisation will be responsible for the maintenance and governance of the services within the service catalogue, and includes the certification of new smart city services into this catalogue. As such, the proposed lifecycle for smart city services in the EPIC service catalogue includes a number of phases, as described as follows (and shown in Figure 6):

1. Service ideation
2. Service design
3. Service transition
4. Service operations
5. Service retirement

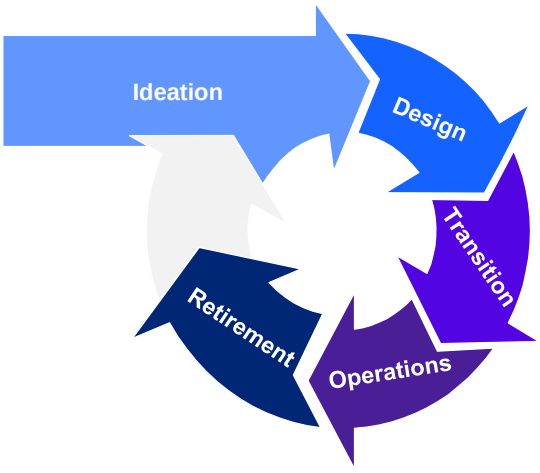


Figure 6 - Lifecycle Management for EPIC Service Catalogue

After the transition of the service towards operations and the take-up of the service in the service catalogue, this smart city service needs to be continuously reviewed, maintained and governed. This management of the service catalogue is performed mainly by the EPIC governance organisation and the overall EPIC consortium. The feedback and evaluations of service owners, business users and the EPIC consortium are taken into account by the EPIC governance organisation for deciding on the review, approval or possible retirement of a particular smart city service.

Service catalogues are a fundamental part of service delivery because they document every service that a service provider can provide and build contracts with its customers (through Service Level Agreements – SLA's) based on how these services are delivered. A service catalogue as this one for EPIC should therefore be accompanied by an example SLA.

Each service within the catalogue therefore typically includes:

- A description of the service
- Timeframes or Service Level Agreements (SLAs) for fulfilling the service
- Who is entitled to request/view the service
- Costs (if any)
- How to fulfil and deliver the service

The following data elements are suggested for describing the business aspects of a smart city service as part of the EPIC service catalogue. However, they are by no means exhaustive and particular data elements could be added or removed when it benefits the use of the service.

- Service Name
- Service Description
- Service Owner
- Service Representative
- Service Criticality
- Availability (e.g. timeframe in which the service can be used)
- Target Availability (e.g. percentage of time available)
- Version
- Backup (e.g. type of backup, frequency, etc.)
- Status (e.g. ideation, design or transition)
- Business value
- Scope/activities
- Deliverables
- Dependencies/considerations

The technical aspects of a smart city service should be described using the specific formats (for example the WebService Description Language (WSDL)[6]), including the detailed linkages, technologies and standards that are applied. This technical description should be provided to the EPIC governance organisation in order to automate the technical aspects in the service catalogue. More information on these technical descriptions (using WSDL) are provided in the technical documentation for the EPIC platform and service catalogue.

2.2.3 Stakeholders, Roles and Responsibilities in EPIC Roadmap

The EPIC roadmap needs to take into account the different stakeholders involved in developing a smart city and implementing and operating smart city solutions (e.g. EPIC services). The primary stakeholders for a smart city project can be identified using the categories business, user and supplier. For the roadmap, these categories were already investigated based on the project documentation and the interviews with consortium members.

The general stakeholders for an EPIC project were identified based on the conceptual model for an EPIC service, a review of EPIC documents and the meetings with consortium members. In Figure 7, an overview is provided of the identified stakeholders for the provision of smart city solutions and EPIC services.

[6] See reference to WSDL standard from W3C (http://www.w3.org/TR/wsdl)

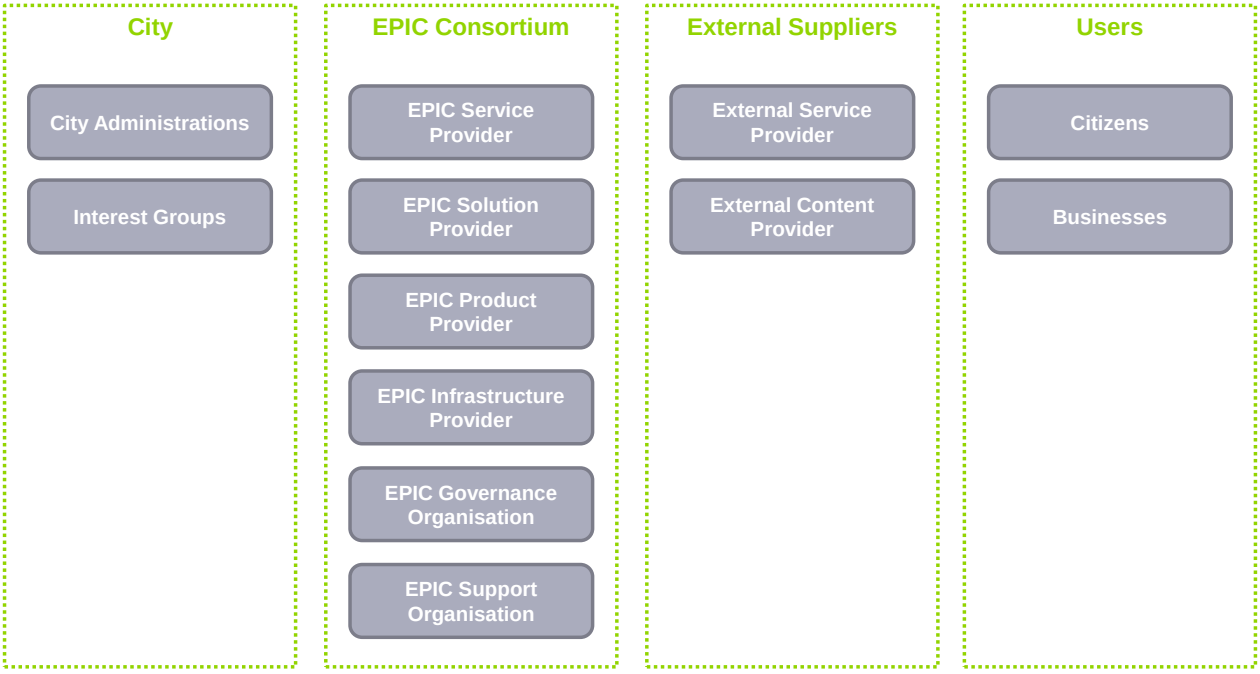


Figure 7 – Overview of Stakeholder Involvement for EPIC Roadmap

In the following table the identified stakeholders for the EPIC roadmap are described in more detail.

Description of Identified Stakeholders for EPIC Roadmap

EPIC Stakeholders	Description
City	
City Administration	The city administration coordinates the city services and will be the main requester for smart city services provided through the EPIC platform. A city administration representative represents the city administration for the implementation of smart city services and will be the main contact person for EPIC projects.
Interest Groups	Interest groups are communities or organisations that have an interest in smart city services and can influence the implementation of EPIC services. (e.g. national or supra-national governments, industry

EPIC Stakeholders	Description
	consortia, businesses or SMEs)
EPIC Consortium	
EPIC Product Provider	The EPIC product provider delivers the underlying product(s) for the specific EPIC service.
EPIC Solution Provider	The EPIC solution provider develops and delivers the solution for the specific EPIC service using the product(s) of the product provider.
EPIC Infrastructure Provider	The EPIC infrastructure provider delivers and operates the infrastructure for running the solution of the EPIC service.
EPIC Service Provider	Within the context of an EPIC project, the EPIC service provider operates and offers the developed solution of the solution provider to the end-users.
EPIC Governance Organisation	The EPIC governance organisation coordinates and manages the delivery of the services and platform, and controls the EPIC service catalogue. As such, the EPIC governance organisation is responsible for evaluating and certifying smart city services for the EPIC service catalogue.
EPIC Support Organisation	The EPIC support organisation delivers relevant support and guidance in the selection, development and operation of the EPIC services, in using the EPIC roadmap and the EPIC service catalogue.
External Suppliers	
External Service Provider	The external service provider delivers supporting services to the implemented EPIC solution of the solution provider, in the operation of an EPIC service.
External Content Provider	The external content provider connects and delivers relevant content to the developed EPIC solutions of the solution provider.
Users	
Citizens and Businesses	Citizens and businesses represent the end-users of the

EPIC Stakeholders	Description
	smart city initiatives and for the provided smart city solutions. They can be involved in the design and development of the relevant EPIC services. - An addressable user can be requested to perform project activities, for example testing. An addressable user representative represents the group of end-users that are closely involved and addressable within an EPIC project. (e.g. employees working for the city administration) - A non-addressable user is a generically identifiable person which can't be requested to perform project activities. This user representative represents the group of end-users that is not closely involved or addressable within an EPIC project. (e.g. citizens living in Europe)

Next to the stakeholders, a project organisational structure, including project roles and responsibilities, could be defined for the execution of an EPIC service implementation project. The project roles involved in the execution of the roadmap are identified based on the proposed phases, disciplines and detailed actions in the roadmap. A generic project organisational structure, including the proposed project roles, is provided in Figure 8.

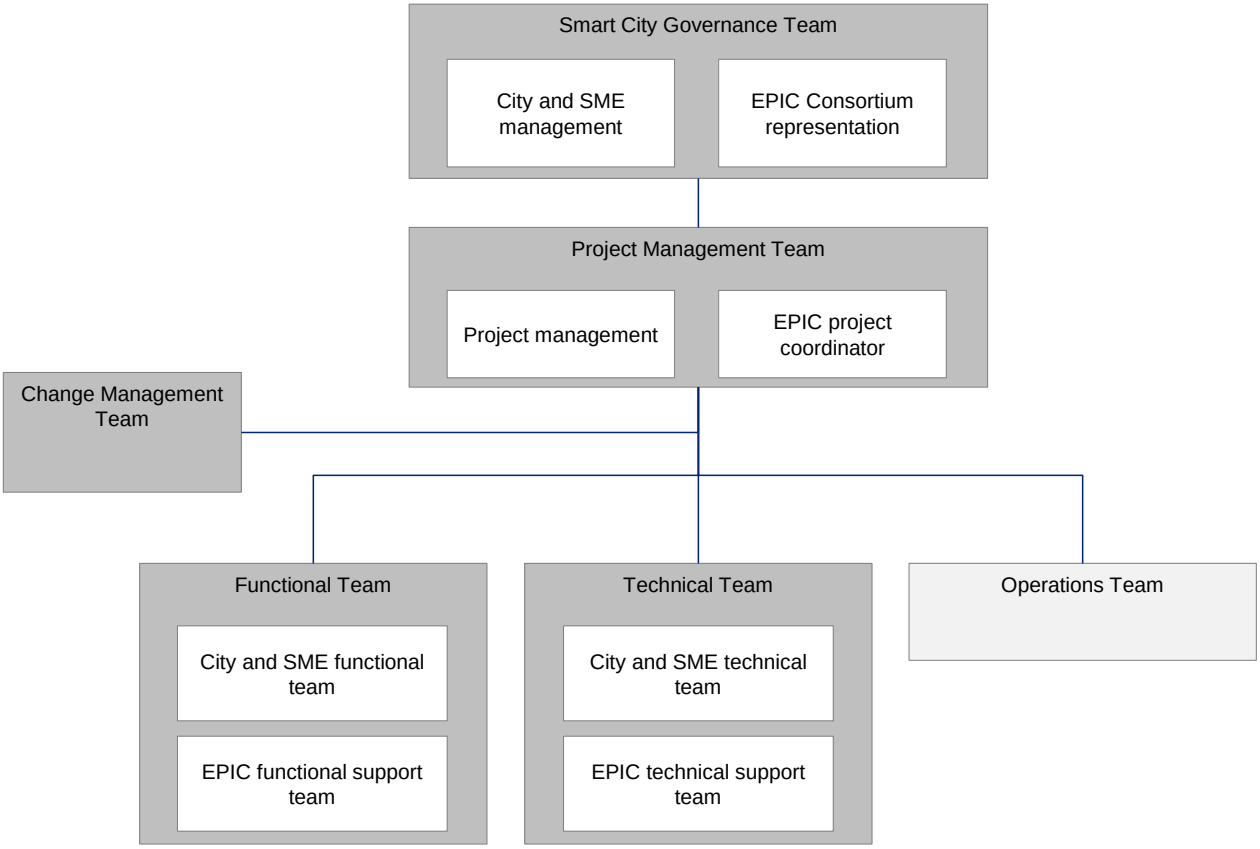


Figure 8 – Organisational Structure and Roles for EPIC Roadmap

In the following table, the proposed roles for the EPIC roadmap are described in more detail.

Description of Identified Roles for EPIC Roadmap

EPIC Roles	Description
Smart City Governance Team	The Smart City governance team evaluates and takes decisions on the relevant smart city initiatives, projects and solutions according to the defined smart city strategy and as documented in the business cases. In this team, the city management and the management of the SMEs are involved in the overall direction-setting. In collaborating with EPIC, the EPIC consortium can be represented in the overall governance team (e.g. by the EPIC support organisation or solution providers).

Project Management Team	The Smart City project management team is responsible for the day-to-day execution and delivery of the smart city projects, especially of the delivery of the required smart city solutions within the defined scope. In this team, the project managers are involved from the different parties (at city or SME level) and a coordinator for the EPIC team.
Change Management Team	The change management team ensures the communication and adoption aspects within the project for the delivery and operation of the smart city solutions and EPIC services. This will be mainly performed by the specific organisations involved in driving these changes, for example the city administrations.
Functional Team	The functional team is responsible for the definition and control of the functional requirements and design for the EPIC services. In this functional team, the business and functional analysts are represented from city and SME level, and could be supported by the EPIC consortium.
Technical Team	The technical team is responsible for the development and control of the technical components for the EPIC services. In this technical team, the technical developers and experts are represented at city and SME level, and could be supported by the technical teams with the EPIC consortium.
Operations Team	The operational team is responsible for the support and operations of the EPIC services, in an operational mode. This operational team is included in the project team (for the duration of the project), especially for the deployment and operations of the EPIC services, and will remain responsible for the operations of the EPIC service after project end.

3 Detailed Description of Roadmap Phases

In this section, the different phases of the EPIC roadmap are described in more detail based on the selected methods, frameworks and tools for the roadmap development (see deliverable D6.1 and D6.2). This detailed description provides city administrations, SMEs, EPIC platform providers, or other relevant stakeholders with the concrete, practical and comprehensive material for executing the roadmap activities.

For each phase, the objectives are described in order to outline the results to be achieved. Next, the tasks and work products are described for each discipline, including an indication of the specific roles to be involved. In each phase, a number of supporting templates are defined for selected work products which are provided in separate documents. These templates are provided for a set of work products that are identified as most specific for the execution of an EPIC service implementation project. For the majority of the work products, possible templates could be derived from general project management methodologies and are less EPIC specific.

3.1.1 Vision Phase



In the **Vision (1) phase**, the smart city strategy is developed by the city administration and relevant stakeholders, using a specific framework and maturity model for smart cities. Based on this strategy, the concrete goals and objectives are defined to be achieved by the city in a specific time period. The strategic actions and plans are developed which would result in the definition of concrete business cases that will highlight the benefits, potential risks and financial impact of specific smart city solutions.

Objectives of the Vision phase

The objectives of the vision phase is to provide an answer to the following questions:

- What is the strategy for the city in order to become a smart city in the future?
- What are the strategic focus areas and concrete goals and objectives for the city?
- What are the strategic actions (and roadmap) that are defined in order to achieve the smart city objectives?
- What are the benefits, potential risks, financial impact, etc. of implementing concrete smart city solutions and specific EPIC services?
- How are the relevant stakeholders involved in the changes towards a smart city?

Tasks and Work Products per Discipline

Discipline	Tasks	Work Products
PM. Project Management *Performed by Smart City Governance Team*	The smart city strategy is developed by the city administration and relevant stakeholders using a comprehensive framework and maturity model. This smart city strategy indicates the specific focus areas for the city and the concrete goals and objectives within each focus area in relation to the overall city strategies and political directions. The business case is developed for the implementation of smart city solutions and specific EPIC services in a city, in order to translate the strategy for the city into actual solutions. In the business case, the scope statement, estimates of benefits, costs and key assumptions for the different alternatives are investigated. It will provide the relevant stakeholders with information needed to make investment decisions on the proposed EPIC services.	Smart City strategy Smart City business cases
OC. Organisational Change & Stakeholder Management *Performed by Change Management Team*	The change management strategy is defined and will encompass an integrated approach to communications, stakeholder engagement and preparation, training, and organisational alignment and transition. The relevant stakeholders are identified within the city and a process of involving stakeholders is designed in order to build commitment to the smart city initiatives.	Change management strategy
RM. Process & Requirements Management *Performed by Functional Team*	Specific customer interviews could be conducted in order to analyse and understand the customer behaviours, needs and preferences for smart city initiatives. This will provide necessary inputs for the evaluation of alternatives in the business cases.	Customer needs analysis Business process vision

Discipline	Tasks	Work Products
	For a smart city transformations, the conceptual process model and process changes are investigated in visioning workshops.	
IM. Information Management *Performed by Technical Team*	As a first step, the possible city data and information sources are analysed in the city and from relevant SMEs (or other providers) in order to define a strategy on the use, integration and analysis of this data within a smart city.	Smart city data strategy
TM. Technology Management *Performed by Technical Team*	The security environment for potential smart city solutions is assessed and applicable security requirements are documented. The policies and procedures of city administrations are compared in order to define a security strategy for smart city services.	Smart city services security strategy

Supporting Templates

Work Product	Template Document
EPIC Smart City strategy	Vision Phase – Smart City Strategy template
EPIC Smart City business case	Vision Phase – Business Case template
Change management roadmap tool	Vision Phase – Change Management Roadmap tool

3.1.2 Plan Phase



In the **Plan (2) phase**, the concrete project plans are developed for the business cases and strategic objectives. The project definition, budget and master plan are developed in order to clearly define the goals and expected benefits, as well as describing the project approach, scope, and key milestones. The project management plan is developed for the implementation of smart city services on the EPIC platform, and includes for example the project organisation, scope, risks, issues, change requests, and budget. A quality management plan is defined to address the project's quality objectives and activities for quality assurance, control and support.

Objectives of the Plan phase

The objectives of the plan phase is to provide an answer to the following questions:

- Which smart city solutions and specific EPIC services should be implemented for achieving the objectives of the city (as defined in the smart city strategy)?
- What is the budget, scope, planning, team, etc. for implementing these smart city solutions?
- How will the smart city project be managed and controlled in order to ensure the right level of quality?

General accepted project management methodologies could be used for the development of this phase. The project management plan defines the project organization, method scope, project tools, and the processes for managing risks, issues, change requests, action items, decisions, deliverable acceptance, budget and project status. A quality management plan is defined to address the project's quality objectives and activities for quality assurance, control and support.

Tasks and Work Products per Discipline

Discipline	Tasks	Work Products
PM. Project Management *Performed by*	Based on the agreed business cases, the project charters are developed and will define the goals and expected benefits of the	EPIC project charter Project management

Discipline	Tasks	Work Products
Smart City Project Management Team	concrete smart city projects. It will address the high-level project scope, assumptions, constraints and other important project information. The project and quality management plans are developed for the initiation of the specific smart city implementation projects. The project management plan is created during project planning and maintained throughout the life of the project. It will be a comprehensive plan for how the project is organised and how it will be executed, monitored and controlled. The quality management plan includes the tasks to plan and monitor project quality, control and confirm work products, and assess project processes and standards. Specific project management documents are created and agreed upon that will be used throughout the project, including project logs and tracking sheets, status reports.	plan Quality management plan Deliverables, issues, risks, action items, decisions and change requests log Budget and cost tracking sheet Project status report
OC. Organisational Change & Stakeholder Management *Performed by Change Management Team*	Determine an organisation's capacity to change and identify opportunities and barriers to change that must be addressed for the project to move forward effectively. Provide initial onboarding materials for the team members of the smart city projects. Provide an overall plan for the communications during project execution and set the objectives for "what" will be communicated to "whom" and "when". The communication strategy should include possible publicity and marketing efforts towards the end-users.	Change readiness assessment results Communications plan EPIC project onboarding materials
RM. Process & Requirements Management	The high-level scope information needs to be described for the business processes that are affected by the project. The scope statement clearly states which processes and sub-	Business process scope statement Business role definition

Discipline	Tasks	Work Products
Performed by Functional Team	processes are in scope and which are not. The roles need to be identified and defined that are required to support the organisation for the smart city solutions.	
IM. Information Management *Performed by Technical Team*	Identify and describe the logical, high-level structure for all the master data and reference data in scope of the smart city solutions. Provide a plan for the data integration and the requirements for the data description, transmission standards, and formats.	Data integration plan
TM. Technology Management *Performed by Technical Team and Operations Team*	Analyse the current state of the technology infrastructure and develop a roadmap for future state technical infrastructure that includes hardware, network, and software components. The roadmap validates whether or not the infrastructure satisfies the configuration and support requirements for the smart city solutions. Conduct assessments from business, information, and technical perspectives in order to understand the current identity and access management environment. Conduct assessments of the current configuration and operation strategies and policies in order to identify gaps and provide recommendations on the configuration and operation strategy and policies. Detail the deployment strategy for the EPIC service on the EPIC platform within the city, including the transition of business processes and solution components.	Technical infrastructure roadmap Identity and access management assessment Configuration and operation strategy and policy assessment EPIC service deployment strategy and support plan

Supporting Templates

Templates could be derived from general project management methodologies.

Work Product	Template Document
Project Charter	Plan Phase – Project Charter template
Project management and quality plan	Plan Phase – Project Management and Quality Plan template

3.1.3 Design Phase



In the **Design (3) phase**, the business requirements are documented and a detailed design for the smart public services is created. In order to create a design, the business processes, software configuration, software gaps, change impacts, application security, and technical infrastructure are taken into account. A proof of concept prototype (or an initial mock-up) is developed to show how the city administrations and citizens/businesses will operate and use the smart city services on the EPIC platform. The proof of concept prototypes will mostly be developed in a living lab context.

Objective of the Design phase

The objectives of the design phase is to provide an answer to the following questions:

- What are the changes to the business processes for the smart city solutions?
- What are the business and functional requirements for the proposed smart city solutions?
- What will be the design and architecture, including the components and interconnections that need to be developed for the smart city solutions?
- What are the possible solutions for the development of the smart city solutions (e.g. EPIC platform services and infrastructures)?
- How to ensure the testing and acceptance by the relevant stakeholders of the smart city solutions?

Tasks and Work Products per Discipline

Discipline	Tasks	Work Products
PM. Project Management *Performed by Smart City Project Management Team*	Adjust and refine the project management plans and procedures as the project progresses and evolves. Provide the necessary project logs, including a follow up of the deliverables, issues, risks, change requests, etc. Provide a budget and cost tracking sheet for the specific reporting period and deliver the project status report to the EPIC project	Project management plan Deliverables, issues, risks, action items, decisions and change requests log Budget and cost

Discipline	Tasks	Work Products
	governance team.	tracking sheet Project status report
OC. Organisational Change & Stakeholder Management *Performed by Change Management Team*	Stakeholders may be less committed to the project than they appear to be. Therefore, action plans need to be created for all relevant stakeholders. The activities need to be documented for involving the identified key stakeholders and other stakeholder groups in the project and change process. Create initial communications material that should prepare key stakeholders to answer project questions on the scope, vision, and change imperative. In short, the initial communications need to answer the who, what, why, when, and how questions about the project. Identify change impacts resulting from process, policy, technology, performance management, and organisation structure changes. This includes review of process design changes, policy changes, organisation or technology changes, etc.	Stakeholder action plan Initial stakeholder communications Change impact summary
RM. Process & Requirements Management *Performed by Functional Team*	Analyse the as-is business processes included in the project scope in order to understand the city administration's current processes and the differences between the current-state and the to-be integrated process designs. Describe the relevant use cases for the EPIC service. Determine the requirements and set the objectives for a proof of concept prototype. The proof of concept configuration includes organisational elements, data and process configurations, and configuration settings that are made in the non-production environment of the EPIC platform. Define the overall testing scope and approach in order to verify that the service will meet	Business process analysis documentation Proof of concept prototype EPIC overall test approach

Discipline	Tasks	Work Products
	business requirements. This includes defining the unit testing, functional and integration testing and user-acceptance testing approach. The functional integration test focuses on testing all elements of an end-to-end business process. The user-acceptance test aims to achieve a sign-off by the responsible stakeholders, and could include possible Living Lab testing with selected end-users.	
IM. Information Management *Performed by Technical Team*	The critical data sources are identified for key master data, transactional data and historical data that will be involved in the smart city solutions. Technical metadata standards could be defined in order to enforce consistency and appropriate reusability of data across systems. Design the subject areas of the conceptual data model and identify the relationships between the subject areas that are central to the business activities. Develop the data entities, their corresponding attributes, and the relationships among them as defined by the business processes in the logical data model. Design the future data architecture and the high-level interaction of systems based on a review of the current architecture assessments and the new requirements for the EPIC service. Identify privacy requirements based on applicable laws, regulations, city policies, contracts, and strategy. Document the applicable privacy-related legal, regulatory, city policy, and contractual requirements organised into the defined categories and subcategories.	Data models Data architecture and integration approach Privacy and data protection requirements and framework
TM. Technology	Define the functional specifications for application-level interface and data interchange. These specifications are	Interface and workflow functional specifications

Discipline	Tasks	Work Products
Management *Performed by Technical Team and Operations Team*	validated or refined to ensure that they provide a high-level understanding of what needs to be created or modified to integrate the solutions and services into the EPIC service. Develop the technical solution architecture for the EPIC service, including the software, infrastructure and integration components architectures. Document the security policies and standards applicable for the city and define a security model and implementation plan for the EPIC service on the EPIC platform. Gather the requirements for identity and access management and develop a corresponding design for the EPIC service.	EPIC service technical architecture EPIC platform security policies, standards, security model and implementation plan Identity and access management solution requirements and design

Supporting Templates

Work Product	Template Document
EPIC service reference design	Design Phase – EPIC service reference design template
EPIC overall test approach	Design Phase – EPIC overall test approach template

3.1.4 Build Phase



In the **Build (4) phase**, the smart city services are implemented based on the design and using the EPIC platform. The testing of the smart city services is performed as is defined in the test management plan. Furthermore, end-user training materials and user guides are developed.

Objectives of the Build phase

The objectives of the build phase is to provide an answer to the following questions:

- What are the technologies and modules used for the development of the smart city solutions on the EPIC platform?
- What are the criteria for determining the readiness and completion of the smart city solutions on the EPIC platform?
- What are the security, data privacy and access controls for the smart city solutions on the EPIC platform?
-

Tasks and Work Products per Discipline

Discipline	Tasks	Work Products
PM. Project Management *Performed by Smart City Project Management Team*	Adjust and refine the project management plans and procedures as the project progresses and evolves. Provide the necessary project logs, including a follow up of the deliverables, issues, risks, change requests, etc. Provide a budget and cost tracking sheet for the specific reporting period and deliver the project status report to the EPIC project governance team.	Project management plan Deliverables, issues, risks, action items, decisions and change requests log Budget and cost tracking sheet Project status report
OC.	Determine an organisation's capacity to	Change readiness

Discipline	Tasks	Work Products
Organisational Change & Stakeholder Management *Performed by Change Management Team*	change and monitor the effectiveness of change management activities completed. Identify opportunities and barriers to change that must be addressed for the project to move forward effectively. Collect feedback as the project progresses to determine whether communications are effective and successful. Consistently use the feedback evaluation, communications feedback report, and communications log tools in order to achieve reliable results. Develop or acquire the training materials to meet the training needs for the project team. For the individual training courses, detail the format of each course, the planned training sessions, participants, and their completion records.	assessment report Ongoing communications material Project team training materials and log
RM. Process & Requirements Management *Performed by Functional Team*	Document the step by step instructions for completing a task using the EPIC service. A business process procedure should be written for each in-scope task / transaction.	Business process procedures
IM. Information Management *Performed by Technical Team*	Test the effectiveness of the privacy and data protection control activities during integration testing to verify functional, performance and reliability. Create privacy and data protection test cases that will represent the conditions or issues to be tested.	Privacy and data protection control activities
TM. Technology Management *Performed by Technical Team and Operations Team*	Develop the integration common services and components for the EPIC service. Perform a security vulnerability assessment for the operating of the EPIC service, including the EPIC platform, external services or connections. Configure and customize installed identity and access management components based	Integration common services and components EPIC service security vulnerability assessment Identity and access management solution

Discipline	Tasks	Work Products
	on the identified solution requirements for the EPIC service.	component installation and test results
	Create the materials for testing backup and recovery mechanisms and to execute the backup and recovery test, which examines production system failure. The test should simulate an actual failure of the service, as closely as possible. Provide the city administrations with an approach if any part of the cutover fails for the EPIC service.	Production backup and recovery test materials EPIC service release readiness criteria Functional integration test materials and environment
	Create and document criteria for evaluating the state of readiness for the go-live date of the new EPIC service.	
	Conduct the functional integration tests according to the overall functional test approach. The testing of the service occurs on the prepared platform testing environment and is a well-orchestrated replication of system and business processes.	

Supporting Templates

Work Product	Template Document
EPIC service release readiness criteria	Build Phase – EPIC service release readiness criteria template

3.1.5 Deliver Phase



In the **Deliver (5) phase**, the business and system transition to the operations environment are prepared and executed. This includes conducting user-acceptance testing, performing end-user training, conducting go/no-go evaluations and establishing the support organisation to help the city administrations after transition.

Objectives of the Deliver phase

The objectives of the deliver phase is to provide an answer to the following questions:

- How are go/no-go decisions taken for the actual transition of smart city solutions into operational mode? (as will already be defined in the Plan phase)
- What is the approach and detailed plan for the actual transition of the smart city solution into operational mode?
- How are the relevant stakeholders prepared for the delivery and usage of the smart city solutions?
- How is the support organised towards city administrations and other relevant stakeholders after service transition?

In order to move to the operate phase, the deployment and cutover of the specific EPIC services to an operational environment should be finalised and the support organisation should be established.

Tasks and Work Products per Discipline

Discipline	Tasks	Work Products
PM. Project Management *Performed by Smart City Project Management*	Adjust and refine the project management plans and procedures as the project progresses and evolves. Provide the necessary project logs, including a follow up of the deliverables, issues, risks, change requests, etc. Provide a budget and cost tracking sheet for the specific reporting period and deliver	Project management plan Deliverables, issues, risks, action items, decisions and change requests log

Discipline	Tasks	Work Products
Team	the project status report to the EPIC project governance team.	Budget and cost tracking sheet Project status report
OC. Organisational Change & Stakeholder Management *Performed by Change Management Team*	Follow up on the action plans for the involvement of all relevant stakeholders in the project and change process. Develop and deliver the end-user learning program. The training sessions can be organised as in-class, instructor-led sessions or as remote training presentations. Deliver the scheduled training for the project team and update and maintain the project team training log with the course conduct information.	Stakeholder action plan End-user training materials Project team training log
RM. Process & Requirements Management *Performed by Functional Team*	Execute an analysis and validation of the EPIC service meeting the initially defined requirements. Develop a comprehensive transition plan for the business processes impacted by the EPIC service.	EPIC service requirements validation Business process transition plan
IM. Information Management *Performed by Technical Team*	Verify the privacy and data protection control activities and to update the privacy and data protection system control framework with any results from unit and integration testing.	Privacy and data protection system control framework
TM. Technology Management *Performed by Technical Team and Operations Team*	Perform a security vulnerability assessment for operating the EPIC service and platform, external services or connections. Execute the user-acceptance test cases in the user-acceptance test environment according to the user-acceptance work plan; and confirm the results. Develop an integrated team plan that details deployment activities and which presents the sequence of activities, resource requirements,	EPIC service security vulnerability assessment report User-acceptance test results Cutover and deployment plan EPIC service release go/no-go criteria

Discipline	Tasks	Work Products
	and timing and dependencies needed to set up and initialise the production environment, to migrate data, and implement new business processes. Evaluate the readiness for going live and make a decision as to whether or not the EPIC service will go live according to the go-live date on the cutover plan and project plan.	evaluations

Supporting Templates

Work Product	Template Document
EPIC service cutover and deployment plan	Deliver Phase – EPIC service cutover and deployment plan template

3.1.6 Operate Phase



In the **Operate (6) phase**, the activities are performed for actually transitioning, operating and supporting the smart city services into actual business operations.

Objectives of the Operate phase

The objectives of the operate phase is to provide an answer to the following questions:

- What are the processes and organisations that are necessary to support the actual operations of the smart city solutions?
- What are the detailed agreements between the different stakeholders for the operations and support of the smart city solutions?

The operate phase is a continuous process in operating and supporting the smart city solutions, such as EPIC services on the EPIC platform.

Tasks and Work Products per Discipline

Discipline	Tasks	Work Products
PM. Project Management *Performed by Smart City Project Management Team*	Adjust and refine the project management plans and procedures as the project progresses and evolves. Provide the necessary project logs, including a follow up of the deliverables, issues, risks, change requests, etc. Provide a budget and cost tracking sheet for the specific reporting period and deliver the project status report to the EPIC project governance team. Based on the initial business case for the EPIC project, a service provisioning document should be developed and approved for the operation of the EPIC service.	Project management plan Deliverables, issues, risks, action items, decisions and change requests log Budget and cost tracking sheet Project status and closure report EPIC service

Discipline	Tasks	Work Products
	Obtain approval to begin project closure activities and ensure and confirm that the project has completed all relevant project closure activities and is ready to be closed.	provisioning document
OC. Organisational Change & Stakeholder Management *Performed by Change Management Team*	Finalise the ongoing communications to the relevant stakeholders for the closure of the EPIC project. Roll out the publicity and marketing communications to the public and non-addressable users.	Ongoing communications material
RM. Process & Requirements Management *Performed by Functional Team*	Perform a post-implementation review of the controls, including a testing of selected controls in order to verify that they are operation as designed.	Controls post-implementation plan
IM. Information Management *Performed by Operations Team*	Implement the identified remediation plans and document new or changed controls in the privacy and data protection control activities. The control activities should include action items, owners, remediation plans, development requirements, and verification requirements.	Privacy and data protection controls post-implementation plan
TM. Technology Management *Performed by Operations Team*	Run security reports, monitor users and their security access, and perform security audits for the production environment of the EPIC platform and service. Document and implement the release management controls within the operational organisation, including error tracking, error correction, and subsequent release management procedures.	EPIC production security administration results Release management controls

Supporting Templates

Work Product	Template Document
EPIC service provisioning	Operate Phase – EPIC Service provisioning template

4 Guidelines for Cities on Use of EPIC Roadmap

As main deliverable of the EPIC project, the EPIC roadmap will be made publicly available as an online tool as well as a brochure (e.g. PDF documents) that can be collected from the EPIC website (http://www.epic-cities.eu/). Furthermore, a summary overview and the extensive set of detailed roadmap templates are made publicly available, next to the overall deliverable D6.3.

The objective of this chapter is to provide guidelines to potential cities on the actual use of the EPIC roadmap. This roadmap will be used by city administrations, SMEs, EPIC platform providers, or other relevant stakeholders in the implementation of EPIC services on the EPIC platform. As such, it could be a challenge for this broad range of stakeholders to understand the different aspects of the roadmap and the potential impacts.

The overall objective of these guidelines is to help cities in the use of the EPIC roadmap to develop and improve their maturity in terms of 'smart city'. As previously mentioned, a city is believed to be smart when investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance.

Furthermore, EPIC believes that a truly 'Smart City' is one that is able to:

1. Benefit from the innovative developments of citizens, SMEs and other actors from across Europe rather than just within their own cities.
2. Leverage a service infrastructure that is capable of delivering 'one stop government' through the integration of services, interoperability of systems and use of actionable intelligence in service delivery.
3. Contribute to a multi-national service-oriented ecosystem by providing and sharing open business processes as services with other cities.

As part of the development of the EPIC roadmap, a testing phase was organised with the city of Tirgu Mures (in Romania) during the pilot stage of the EPIC services (including the Relocation, Urban Planning and Smart Environment service). The concrete guidelines as presented in this section are largely based on the experiences and feedback received from this testing of the roadmap with the city of Tirgu Mures.

4.1 Objectives of Testing the EPIC Roadmap in the City of Tirgu Mures

The purpose of testing the EPIC roadmap in Tirgu Mures was to work together with the city of Tirgu Mures on the different phases and templates as provided in the roadmap. The roadmap phases were discussed in their sequential order, and for each phase the most relevant templates were selected and discussed. Next, the project team for Tirgu Mures

provided detailed content and feedback on these templates, for example on the structure, content, methods, etc.

The concrete scenario for the testing of the roadmap with the city of Tirgu Mures started from the defined Digital Strategy for Tirgu Mures (DigitalMures)[7] and the developments of the pilot EPIC services (i.e. the Relocation service) on the EPIC platform. The implementation of the Relocation Service Application in Tirgu Mures was triggered by the developing of the EPIC project. Tirgu Mures has a Digital Strategy to become a Smart City, and the project and application are a step forward for implementing this strategy. Tirgu Mures wants to implement all the innovative eGovernment solutions, cloud computing services, latest technological systems for creating an ecosystem in which the City Hall, businesses and citizens can communicate easier, faster, more efficient, at lower costs.

In particularly, the Relocation service was linked with the 2nd component of the Digital Mures strategy on the development of a science city for research and medical informatics. This Relocation service helps these users to find a place to live in Tirgu Mures, by enabling them to perform queries to find certain locations in the city according to their specific needs and constraints. The query results are then visualized on a map using internet services on fixed or mobile devices. As a result, these users will be able to find the information they need faster, easier, up-to-date, and from their offices, home or on the streets.

As main stakeholder, the Tirgu Mures City Hall was interested in developing new technological standards for eGovernment solutions and better and faster ways of communicating with citizens and businesses from the city government. The small and medium sized businesses (SMEs) in Tirgu Mures were interested in using the latest cloud technology and developing applications for the EPIC platform and commercialising products and services through the platform reaching other cities and countries. Citizens and businesses were particularly inter interested in easier ways for communicating with Tirgu Mures City Hall, finding up-to-date information faster, more effective ways to reduce bureaucracy and improve the delivery of public services.

Different stakeholders and persons were involved in the testing of the EPIC roadmap with the city of Tirgu Mures. First, a number of technical and business representatives were involved from Tirgu Mures itself, including the coordinator of the Digital Strategy, City Hall collaborators, and strategy and project consultants. Secondly, the EPIC functional team coordinated the different activities and organised the workshop and bi-weekly conference calls. Thirdly, the EPIC project governance and management teams were involved in the overall steering of the Tirgu Mures developments. Figure 9 shows the structure of the project team involved in the testing of EPIC in the city of Tirgu Mures, including the different teams from Tirgu Mures and the EPIC consortium.

[7] More information on the Digital Mures strategy can be found on the website: http://www.digitalmures.com/

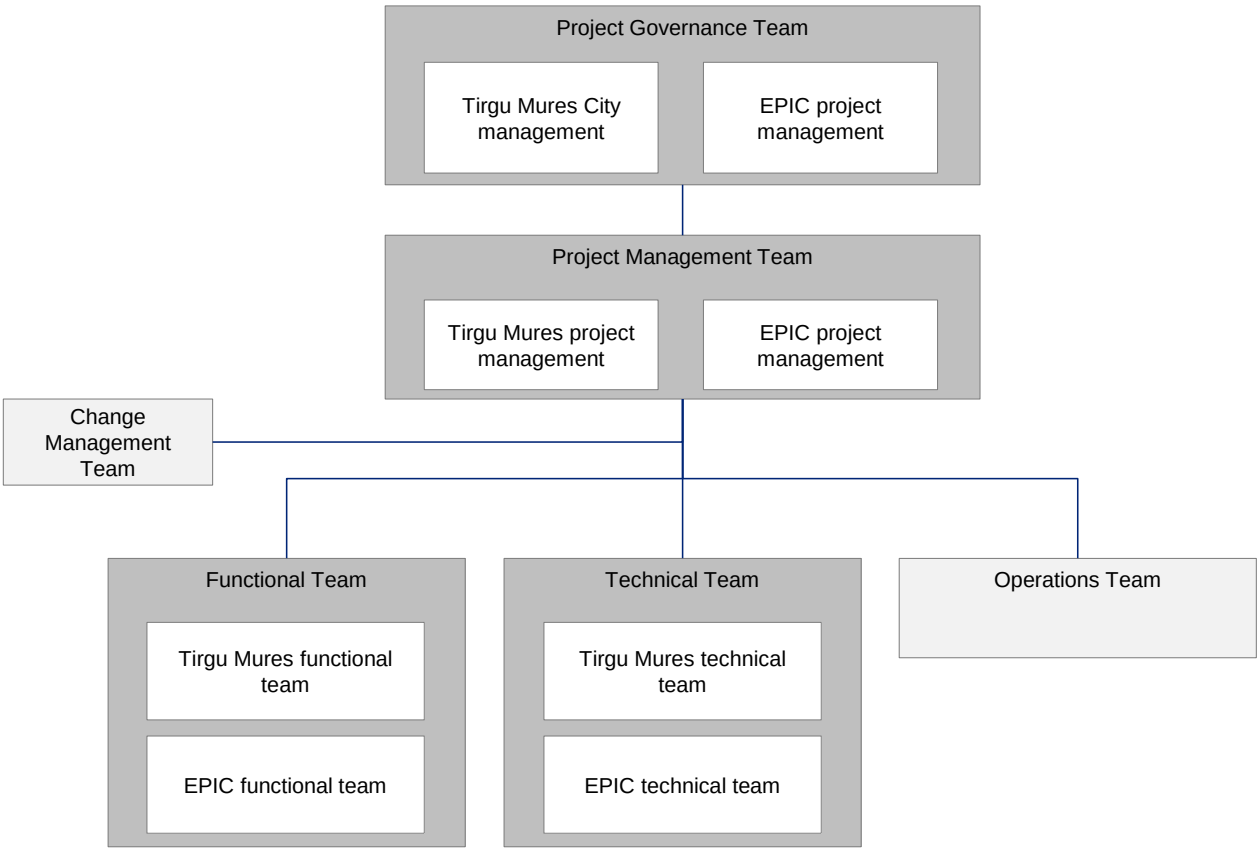


Figure 9 - Project Organisation for Testing in the City of Tirgu Mures

4.2 Tasks Performed and Results Achieved in the City of Tirgu Mures

As previously indicated, the roadmap descriptions, tasks and templates were tested together with the Tirgu Mures functional team. The different roadmap phases were reviewed and discussed, and input was received for the particular templates in each phase. Based on this testing results and feedback received, concrete guidelines can be provided on the involvement of resources and the estimated efforts for each phase.

Figure 10 provides an overview of the estimations for applying the EPIC roadmap, based on the experiences in Tirgu Mures. An indication is provided for the potential involvement of the different project teams during the different roadmap phases.

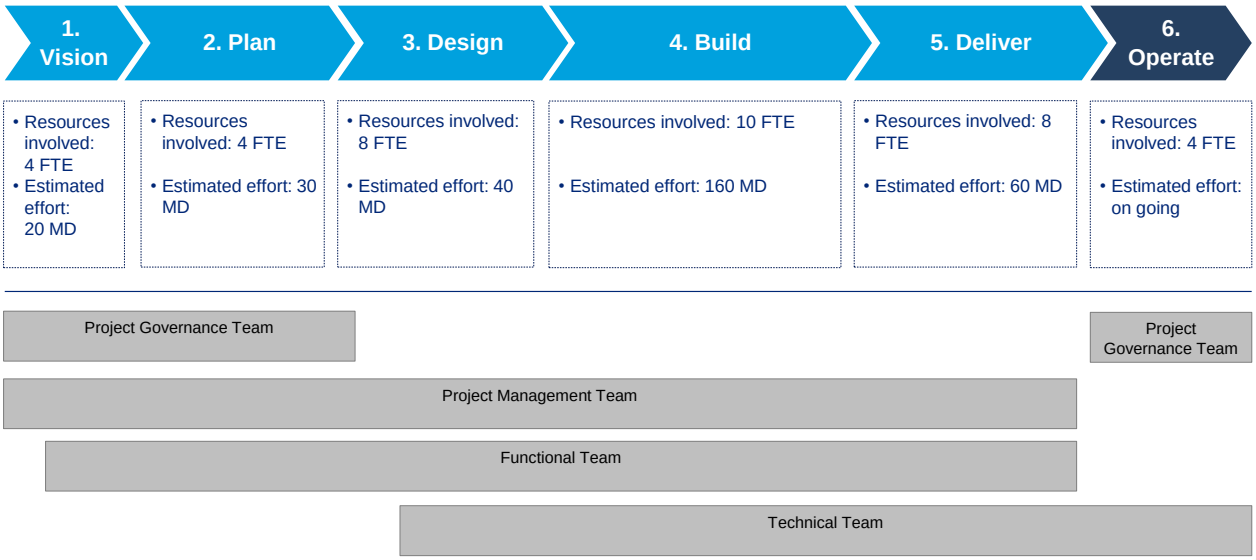


Figure 10 - Overview of Estimations for Using the EPIC Roadmap in Tirgu Mures

From the feedback received, the particular planning of the testing activities (i.e. the parallel technical and roadmap implementations) caused difficulties in the alignment between the roadmap phases and the completion of the templates with the technical implementation results. This alignment was particularly necessary for the more 'technically' oriented roadmap templates for the design, build and transition phases.

The following overall considerations and conclusions for the EPIC roadmap could be made based on the roadmap testing in Tirgu Mures:

- Explicit need for the alignment of the roadmap phases with the technical developments of the EPIC pilots, including an improved project management at city level between the technical and business teams
- For the different phases of the roadmap, different expertise and skills are necessary to implement the actions and define the detailed results. This translates into the need for collaboration and involvement of various stakeholders at both city management and IT level.
- The development of a smart city strategy should be the main driver for implementing concrete smart city solutions and services. This smart city strategy should be fully aligned with the overall strategies of the city (e.g. the Digital Strategy in Tirgu Mures). The necessary decision-taking powers should be involved in moving from the smart city strategy to defining the concrete business cases and plans for the implementation of smart city solutions.
- More services and examples from other cities should be made available in order to indicate their usefulness and how they helped the relevant stakeholders in reaching their strategic objectives (for example in the different smart city domains).

For using the EPIC roadmap, it could take a little more time for the city administrations and involved stakeholders to understand and to be convinced of the benefits of implementing the smart city strategy and specific solution business cases. Some of the template

descriptions should be improved in terms of the perceived ease of use and their common understanding by the different stakeholders (in particular the city administrations).

In the following table, a detailed description is provided for the activities and tasks performed, and results achieved in the testing with the city of Tirgu Mures. For each roadmap phase, an indication is provided of the resources that were involved (FTE, full time equivalents) and the estimated effort (MD: man-days) and expected duration (M: months) for completing the phase.

1. Vision Develop the Smart City strategy and business cases.	***Tasks performed:*** Defining a digital city strategy for Tirgu Mures, focussing on different areas and defining possible cases for smart city services on the EPIC platform (including the Relocation service). ***Results achieved:*** - An elaborated smart city strategy based on the Digital Mures strategy - A business case for the Relocation service ***Difficulties experienced:*** The involvement of city government and overall management is crucial in this phase for the development of a smart city strategy. Also, the involvement of different stakeholders will ensure the support and commitment for achieve the objectives.	***Estimates and planning:*** Resources involved: 4 FTE Estimated effort: 20 MD Expected duration: 1 M
2. Plan Develop the project plans and quality objectives.	***Tasks performed:*** Defining the project objectives and the planning to reach them. ***Results achieved:*** - Planning of activities, - Processes and team involvement ***Difficulties experienced:*** The defined roadmap phases should be included in the project planning, and the	***Estimates and planning:*** Resources involved: 4 FTE Estimated effort: 30 MD Expected duration: 2 M

	involvement of the different project teams should be clearly indicated (especially in terms of collaboration between functional and technical teams).	
3. Design Gather business requirements and design smart city services.	***Tasks performed:*** Defining the Relocation service, and detailing the technical and business requirements. ***Results achieved:*** - Requirements for Relocation service - Design of the Relocation service on EPIC ***Difficulties experienced:*** Identifying and defining the business and technical requirements should involve possibly external stakeholders (i.e. citizens and businesses), and experience within the domain.	***Estimates and planning:*** Resources involved: 8 FTE Estimated effort: 40 MD Expected duration: 2 M
4. Build Implement and test smart city services.	***Tasks performed:*** Implementing the technical and business solutions for the Relocation service on the EPIC platform. ***Results achieved:*** - Final version of the services and business model ***Difficulties experienced:*** Clear coordination and communication is needed between the business, functional and technical teams (from both city level and EPIC) in delivering the specific services on the EPIC platform.	***Estimates and planning:*** Resources involved: 10 FTE Estimated effort: 160 MD Expected duration: 4 M

5. Deliver Prepare business transition for smart city services.	***Tasks performed:*** Preparation for delivery of the services and business model. ***Results achieved:*** - Transferred the entire city ecosystem and EPIC services ***Difficulties experienced:*** The change management and communication towards the different stakeholders should be clearly defined and performed.	***Estimates and planning:*** Resources involved: 8 FTE Estimated effort: 60 MD Expected duration: 3 M
6. Operate Actual operation and support of smart city services.	***Tasks performed:*** Worked on "best practices" for the operation of the entire city ecosystem and EPIC platform and services. ***Results achieved:*** - Support organisation for Relocation service ***Difficulties experienced:*** The concrete SLAs should be established for the operational conditions of the EPIC platform and services within the city ecosystem.	***Estimates and planning:*** Resources involved: 4 FTE Estimated effort: *on going* Expected duration: *on going*

Annex I: References

[1] EPIC Deliverable D2.1 “Project Vision”, http://www.epic-cities.eu, 2011
[2] EPIC Deliverable D2.2 “Stakeholder (User) Workshops’ Results”, http://www.epic-cities.eu, 2011
[3] Smart cities in Europe, Andrea Caragliu, Chiara Del Bo, Peter Nijkamp

Annex II: List of Abbreviations

Abbreviation	Description
CIBG	Centre for Information of Brussels Region
COM	Communication (as official communication from European Commission)
DEL	Deloitte
EPIC	European Platform for Intelligent Cities
FTE	Full Time Equivalents
HTTPS	HyperText Transfer Protocol Secure
IaaS	Infrastructure-as-a-Service
ICT	Information and Communication Technology
ICTPSP	ICT Policy Support Programme
IM	Information Management
IOC	Intelligent Operations Center
IoT	Internet of Things
IPR	Intellectual Property Rights
ISV	Independent Software Vendors
IT	Information Technology
ITIL	Information Technology Infrastructure Library
MD	ManDays
OC	Organisational Change
PaaS	Platform-as-a-Service
PDF	Portable Document Format (from Adobe)

Abbreviation	Description
PM	Project Management
REST	REpresentational State Transfer
RM	Requirements Management
SaaS	Software-as-a-Service
SME	Small and Medium Enterprise
SOAP	Simple Object Access Protocol
SSL	Secure Socket Layer
TM	Technology Management
W3C	World Wide Web Consortium
WP	Work Package
WSDL	Web Service Definition Language
XML	eXtensible Markup Language

Annex III: Templates for EPIC Roadmap

Next to this document D6.3, the concrete templates and materials for the application of the EPIC roadmap can be found in the separately provided documents, as part of this Annex III. As part of the document D6.3, these templates are made available to the relevant stakeholders on the EPIC public website. The provided templates for the different phases in the EPIC roadmap include the following:

- Template 1: Vision Phase – EPIC Smart City Strategy
- Template 2: Vision Phase – EPIC Smart City Business Case
- Template 3: Vision Phase – Change Management Roadmap tool
- Template 4: Plan Phase – EPIC Project Charter
- Template 5: Plan Phase – Project Management and Quality Plan
- Template 6: Design Phase – EPIC Service reference design
- Template 7: Design Phase – EPIC Overall test approach
- Template 8: Build Phase – EPIC Service release readiness
- Template 9: Deliver Phase – EPIC Service cutover and deployment plan
- Template 10: Operate Phase – EPIC Service provisioning

TEMPLATE

Project Acronym: **EPIC**

Grant Agreement number: **270895**

Project Title: **European Platform for Intelligent Cities**

EPIC Roadmap for Smart Cities

Template 1: Vision Phase – EPIC Smart City Strategy

Version: 0.1

Authors:

Project co-funded by the European Commission within the ICT Policy Support Programme		
Dissemination Level		
P	Public	
C	Confidential, only for members of the consortium and the Commission Services	

1. Executive Summary

<< Provide a short summary of this document, including the purpose of this document, the outcomes of the maturity assessment and the strategic initiatives to become a smart(er) city. >>

2. Introduction

<< Describe the city context and general city strategy. Describe the mission and vision, the key issues and the value proposition for the city. Highlight the needs and requirements for the city to becoming a smart city. >>

<< Indicate the questions that should be answered in this document, for example what are the current initiatives that support the city in being smart, what is our final goal and which initiatives shall we have to take? >>

2.1 Purpose of this Document

Based on the city context, the mission, the vision and the current activities the strategy documentation will provide an overview of the different domains and characteristics related to being a smart city. This document will objectify the current state of the city's maturity in relation with the Smart City Strategy framework.

Based on the results of the Maturity Assessment, the strategic path of the city will be described in this document. It will be clearly noted on which strategic domains and on which strategic characteristics the city wishes to focus on to obtain a new level of maturity.

This strategy document will form the basis for the development of business case documents in which the opportunities, benefits, risks, etc. of the strategic initiatives will be described. The intended audience of this document includes the city administration and citizens / businesses operating within the city.

2.2 Content of this Document

This document provides a detailed description of the aspects constituting a strategy document, including the following:

- The mission and vision of the city on which the Smart City Strategy should be based
- Smart City framework, including the strategic domains and the strategic characteristics.
- Maturity Assessment of the city in relation to the Strategy framework
- Strategic growth path to become a smart(er) city.

These aspects are described in more detail in the following chapters.

3. Mission and Vision

<< Provide a short description of the general mission and vision of the city. This is important for al readers of the document since normally all the strategic initiatives defined in this document should be in line with the mission and vision. In this stage of the document it is a good idea to describe the high level views on the link between mission, vision and being a smart city, without prior knowledge of the Smart City framework. This will enable the reader to have a better understanding of the reasoning of the different stakeholders involved in the creation of this document >>

4. A Smart City Strategy

A smart city strategy indicates the specific focus areas for the city and the concrete goals and objectives within each focus area. The smart city strategy is developed by the city administration and relevant stakeholders using a comprehensive framework and maturity model.

4.1 Strategic Domains and characteristics for a Smart City

<< Provide a description of the current state of the city based on the Smart City framework. In this light, the current state should include the comprehension of the participants of the strategic domains and how this relates to initiatives currently ongoing in the city. For the different domains there should be an indication of the manner that strategic characteristics are met, which goals are to be set for the domain and which initiatives could be included in a strategic roadmap to cover an improvement in one or more strategic domains.

Use the smart city framework to discuss and brainstorm on the possible focus areas, and identify the specific objectives within each focus area.

Smart City Framework:

A comprehensive framework is provided for cities to help them develop their smart city strategy. This framework provides six strategic domains and six strategic characteristics to describe goals and initiatives to become a smart city. The characteristics will help to analyze and improve the maturity of the city within each strategic domain and identify areas of improvement. >>

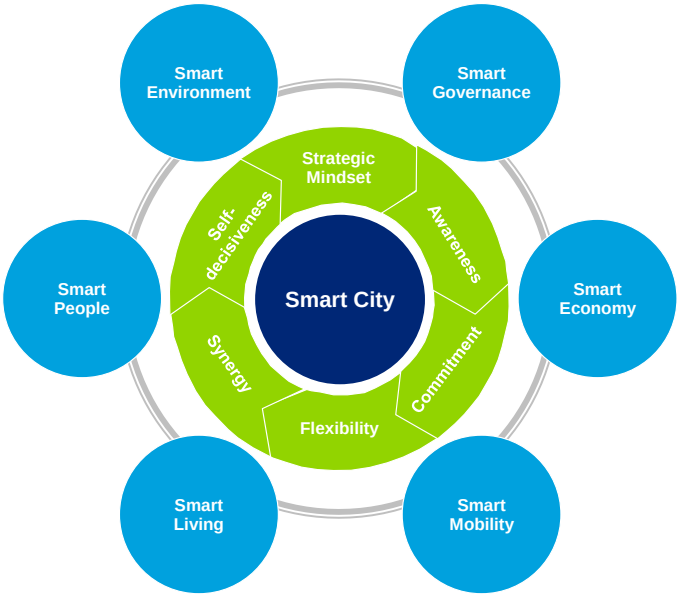


Figure 11 - Overview of Smart City Framework

Smart City framework: Strategic domains

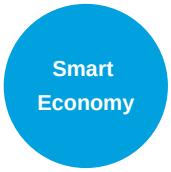
A strategic domain describes an area of focus for which goals and initiatives can be identified that support the growth path to a desired state, i.e. becoming and remaining a smart(er) city.

Six major strategic domains have been identified:



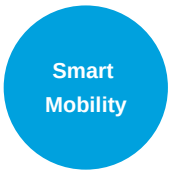
Smart Governance is characterized by the involvement of all relevant stakeholders in policy making and implementation, while using technology to facilitate and support the above. It incentives stakeholders to use resources in wiser manners, and enables them to trade short-term individual agendas for long-term community-focused benefits.

Factors: Participation, public and social services, transparency, political strategy, financial management



Smart Economy is characterized by the ability to leverage the resources available at community level in order to build a community trademark, while using technology to facilitate and support this process. In a smart economy innovation is the "force" that moves the resources available in the right direction, and prevents bottlenecks in resources (be they financial, human or time-related).

Factors: Innovative mindset, entrepreneurship, branding, productivity and flexibility, international



Smart Mobility is the ability to embed mobility in the life of a community in a natural way, while minimizing the costs related to it. While smart mobility requires more investment in resource planning and operation, and service customization, the investment pays off in the long run, as citizens generally endorse investment/spending on mobility that serves their needs.

Factors: Local and international accessibility, ICT-infrastructure, sustainable and safe transport systems



Smart Living is characterized by the ability to get access to and benefit by housing, healthcare, education and leisure facilities that emulate their needs to the highest extent possible. The benefits of using technology in such cases are obvious as smart living requires that many variables be taken into account (e.g. income, proximity to points of interest, health conditions, age etc.) when designing and providing services that cater to the needs of various groups of citizens.

Factors: Cultural facilities, healthcare, safety, quality of buildings, touristic attractiveness, social cohesion



Smart People is characterized by developing a habit of participating in the life of the community and regarding this as a benefit rather than a burden. This mindset develops at community level once the individuals become aware of the benefits provided by social and ethnic plurality, cosmopolitanism, creativity at community level and lifelong learning.

Factors: Qualifications, lifelong learning, creativity, open minded, participation, education facilities



Smart Environment is the canvas on which the areas above can expand, with the support of technology. Providing the facilities listed above in a sustainable environment (e.g. balance between built and green areas; water resources available in proximity, etc.) is crucial, otherwise the cost of providing such facilities would increase exponentially over time.

Factors: Attractiveness, pollution and protection of nature, sustainability of resources

Smart City framework: Strategic characteristics

A strategic characteristic gives an indication whether the goal or the initiatives will have positive influence on the advancements on the strategic growth path. If the characteristic can be attributed, then this should have a positive impact on the growth path towards becoming a smart(er) city.

Six strategic characteristics have been identified.



Strategic mindset: the goals set in order to develop a smart city should be defined and planned for in the long-run in order to make the investments related to these goals (e.g. time, money, human resources, etc.) as efficient as possible. Also, planning for longer business cycles, would give the stakeholders "the bigger picture" of the endeavor towards a smart city, and could justify initial trade-offs in resources.



Awareness: successful projects require that all/the majority of the stakeholders (e.g. businesses, citizens, the municipality, tourists, etc.) be aware of the developments so that they can get actively involved (and save the municipality time and resources), come up with suggestions, maybe even contribute resources (e.g. donors), and get buy-in from those that will actually be using the system.

Commitment

Commitment: Once the stakeholders are aware of the developments, it is in their own interest to be committed to the project (as they will be impacted to some extent by it). Hence, if it is well promoted by the municipality (i.e. encouraging collaborative government) the commitment should come naturally.

Flexibility

Flexibility: It is important that once certain goals are set, the stakeholders are flexible with regards to the means for achieving those. For instance, as recent technical developments show, innovation becomes obsolete quite fast and accepting new solutions can save stakeholders money and time.

Synergy

Synergy: While a municipality may choose to focus on all or only a few of the areas defining a smart city (e.g. governance, economy, mobility, living, people environment), the actions carried under each of these areas should be coherent both internally (within each area) as well as across areas.

Self-decisiveness

Self-decisiveness: the stakeholders involved should be able to initiate ideas and changes (when reasonable) and not wait for other actors to initiate change, when necessary.

<< The following format can be used during workshops and will give an immediate overview of the situation for each strategic domain. The content can easily be reused for the maturity assessment and for the definition of the strategic path.

Domain	*Smart Governance*				
Description	*Smart Governance is characterized by the involvement of all relevant stakeholders in policy making and implementation, while using technology to facilitate and support the above. It incentives stakeholders to use resources in wiser manners, and enables them to trade short-term individual agendas for long-term community-focused benefits.*				
Current Goals					
Initiatives					
Examples			On-going		
Strategic Characteristics of Goals and On-going initiatives					
Are the goals and initiatives in line with the strategic characteristics					
Strategic Mindset	Awareness	Commitment	Flexibility	Synergy	Self-decisiveness
Y/N	Y/N	Y/N	Y/N	Y/N	Y/N

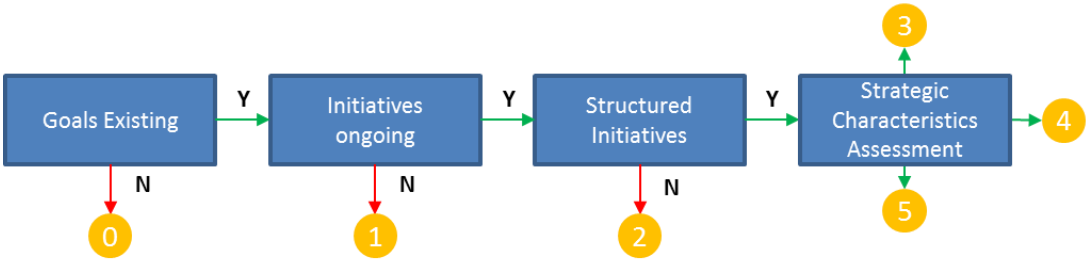
Future Goals (retained current + new)
Future Initiatives (retained current + new)

>>

4.2 Assessment of Smart City Maturity

<< Based on the information assembled during the analysis of the strategic domains and the strategic characteristics, the city should evaluate the maturity of each domain and as a consequence identify the areas of improvement that certainly need to be included in the strategic growth path. >>

Based on the proposed smart city framework, a maturity assessment could be performed for the different smart city domains. Based on the goals, the strategic initiatives and the strategic characteristics within each smart city domain, a measure for smart city maturity could be derived. Based on proven methods for defining maturity models a six level maturity model for the domain can be defined:



- **Level 0 - Nothing:** The city has not defined any goals to become smart(er) for the domain
- **Level 1 – Nothing but goals:** The city has defined goals to be considered a smart city on the domain, but no initiatives have been launched to attain these goals
- **Level 2 – Non-structured initiatives**: The city has launched initiatives to attain certain goals in the domain, but most of them are not well-documented, there is no clear governance or no project management practices are in place.
- **Level 3 – Structured initiatives with weighted score 2 or below**: There are structured initiatives but (most of them) don't seem to meet any or a limited number of the strategic characteristics.
- **Level 4 – Structured initiatives with weighted score 3**: There are structured initiatives and the strategic characteristics are partially met.
- **Level 5 – Structured initiatives with weighted score 4 or above**: There are structured initiatives and most of them meet the strategic characteristics.

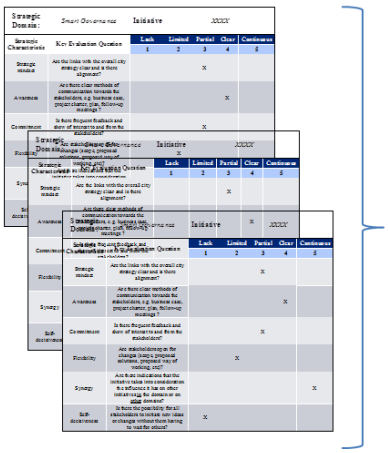
Level 0 till level 2 are quite straightforward to determine. For level 3 till 5 the assessment of the strategic characteristics plays an important role and the way of working is described hereunder.

For the assessment of the strategic characteristics, the starting point is a matrix that indicates the way the different characteristics are present for the initiatives.

Strategic Domain		**Initiatives**				
Characteristic	*Evaluation Question*	**Lack**	**Limited**	**Partial**	**Clear**	**Continuous**
		1	**2**	**3**	**4**	**5**
Strategic mindset	Are the links with the overall city strategy clear and is there alignment?			X		
Awareness	Are there clear methods of communication towards the stakeholders, e.g. business case, project charter, plan, follow-up meetings ?				X	
Commitment	Is there frequent feedback and show of interest to and from the stakeholders?			X		
Flexibility	Are stakeholders open for changes (scope, proposed solutions, proposed way of working, etc)?		X			
Synergy	Are there indications that the initiative takes into consideration the influence it has on other initiatives in the domain or on other domains?					X
Self-decisiveness	Is there the possibility for all stakeholders to initiate new ideas or changes without them having to wait for others?	X				

One can choose to assess the characteristics for each identified initiative within the domain or to estimate for the whole of the initiatives within the domain in general.

Evaluation per initiative

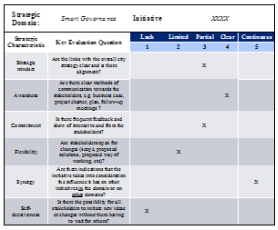


Across all initiatives: (∑ of rating per strategic characteristic / #initiatives) = average score per characteristic

↓

Across all characteristics: (∑ of weighted scores per characteristic) / #strategic characteristics (i.e. 6)) = maturity score for the strategic characteristics.

Evaluation for total domain



Across all characteristics: (∑ scores per characteristic) / #strategic characteristics (i.e. 6)) = maturity score for the strategic characteristics.

It is the Maturity Score for the strategic characteristics that translates back to the overall Maturity Score for the domain as mentioned above.

The interpretation of the maturity score for each domain is generally influenced by personal opinions, but in general the following could be decided:

- **Level 0 and 1**: The basis for a smart growth path is not present for the domain. The city needs to decide whether it wants to become "smarter" for the domain and if so, it has to start with defining their understanding of smart for their city in the concerned domain.
- **Level 2**: There are initiatives present in the domain, but the overall project management is not adequate enough to guarantee the success of these initiatives in supporting the smart growth path for the domain. The city needs to start by putting in place a good project management process before continuing with the next steps.
- **Level 3**: There is a need for a re-alignment between the on-going initiatives and the strategic characteristics. Extra subjects, controls or other measures need to be put in place to guarantee the fit with the strategic characteristics.
- **Level 4 and 5**: The initiatives will provide value to the strategic growth path for the domain if their performance remains the same. The stakeholders need to monitor the strategic characteristics throughout time to keep the performance at-level.

In a graphical way, the maturity level for all domains can be communicated through a spider diagram.

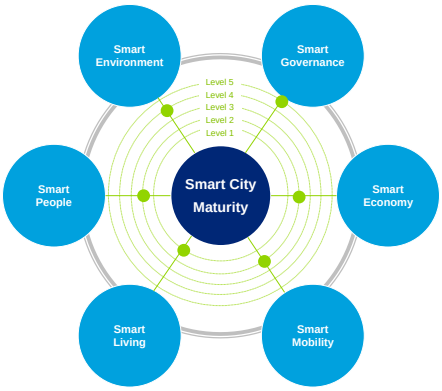


Figure 12 - Overview of Maturity Measures for Smart City Domains

Based on the results of the workshops on smart city strategy, the maturity assessment and a further reflection on the future, the stakeholders can define action plans to attain To-Be maturity levels for one or more domains. This can also be depicted in a spider diagram.

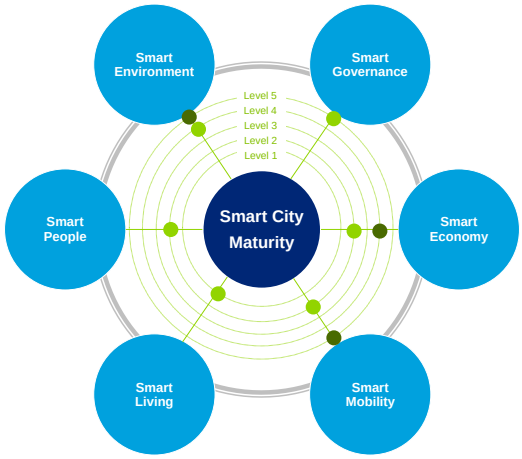


Figure 13 – Target Maturity for Smart City Domains

5. Strategic Plans for Smart City Implementation

5.1 Evaluation of Initiatives to be implemented

<< After brainstorming about current and possible future initiatives and after assessing the current maturity of the city on the different smart city domain, it is necessary to make decisions on the opportunities identified during the previous activities. To facilitate this activity the following template (per domain can be used) >>

Domain		*Smart Governance*					
Id	**Identified initiative**	**Description**	**High-level benefits**	**Risks**	**Importance (High / Medium / Low)**	**Estimated Difficulty (High / Medium / Low)**	**Develop Business Case (Yes / No)**

<< There are several important aspects to keep in mind when evaluating the different initiatives:

- *Include all relevant stakeholders:*

  Before investing into defining and then implementing a Smart City strategy, the municipality should engage representatives of stakeholders' groups into outlining the priorities of the city in the long run. It is crucial that the "long run" perspective be considered the red thread throughout the stakeholders consultation process, because smart cities develop in time, building upon achievements in various focus areas (people, economy, environment, governance, living, mobility). Hence by engaging representatives of the relevant groups directly concerned by achievements in the various focus areas of a smart city (e.g. citizens, businesses, NGOs, other public institutions, etc.) one ensures a holistic overview of the priorities, resources and goals at stake. Such an approach, which focuses on win-win scenarios for the stakeholders involved, prevents subsequent "veto" reactions from one or multiple stakeholders, which is crucial for the success of a long-run initiative, such as creating a smart city. Also, it prevents changes in the agenda (i.e. that may be caused by political shifts) and ensures that initially-set goals are followed through with the same level of commitment form the parties involved.

- *Taking into account the relationships across domains and the different characteristics*

  As mentioned before, a smart city is defined by looking into six key areas (people, economy, environment, governance, living, mobility) which are of high importance for all stakeholders involved.

  Certainly, smart cities may choose to focus on just one or some of the focus areas presented above, to develop competitive advantages in those areas and brand themselves accordingly (e.g. the IT city, the R&D city, the city with the highest living standards, the city with the best preserved/least

polluted environment, etc.). However, in the long run they will probably end up incorporating all six key areas into their Smart City strategy because all these areas are closely related. For instance, smart living can only occur when citizens are part of a smart economy that insures sufficiently high living standards; when they are part of a smart environment that is, a balanced ecosystem which uses natural resources in a sustainable manner (air, water, soil, fauna, vegetation, ores, etc.) to ensure that they can go around for future generations as well; when smart mobility exists to ensure that citizens do not waste time (a monetisable resource!) when commuting from work to their homes or from one location in the city to another; when citizens are involved and have a say in the smart governance of their city.

To ensure that the achievements in one key area are leveraged in other key areas of a smart city, it is important that the stakeholders take into consideration the six characteristics presented below when evaluating the different initiatives:

- *Strategic mindset: the goals set in order to develop a smart city should be defined and planned for in the long-run in order to make the investments related to these goals (e.g. time, money, human resources, etc.) as efficient as possible. The question that therefore needs to be asked for each initiative is: Is the initiative in line with the goals set-out?*
- *Awareness: successful projects require that all/the majority of the stakeholders (e.g. businesses, citizens, the municipality, tourists, etc.) be aware of the developments so that they can get actively involved (and save the municipality time and resources), come up with suggestions, maybe even contribute resources (e.g. donors), and get buy-in from those that will actually be using the system. As a minimum, the initiatives selected for the development of a business case should be known and agreed upon by all stakeholders.*
- *Commitment: Once the stakeholders are aware of the initiatives to be developed, it is in their own interest to be committed to the next steps (as they will be impacted to some extent by it). Hence, if it is well promoted by the municipality (i.e. encouraging collaborative government) the commitment should come naturally. So again, it is important that all stakeholders understand the initiatives to be developed and that they support them.*
- *Flexibility: It is important that once initiatives are set, the stakeholders are conscientious that they need to be flexible with regards to the means for achieving those. For instance, as recent technical developments show, innovation becomes obsolete quite fast and accepting new solutions can save the stakeholders money and time.*
- *Synergy: While a municipality may choose to focus on all or only a few of the areas defining a smart city (e.g. governance, economy, mobility, living, people environment), the initiatives carried under each of these areas should be coherent both internally (within each area) as well as across areas.*
- *Self-decisiveness: For each initiative stakeholders involved should be able to initiate ideas and changes (when reasonable) and not wait for other actors to initiate change, when necessary. Initiatives should therefore be defined in a manner that this characteristic can be met.*

- *Possibility to highlight specific tools to be used*

Although not necessary, it can be interesting to already think about a possible tool to support the implementation of the initiative. This will have an influence on the assessment of the benefits, the difficulty to develop the initiative and the need to develop a business case. In this way, already thinking about a possible tool can identify quick wins and accelerate the delivery of the initiative.

5.2 Examples of Smart City Solutions and Implementations

<<This section provides some examples of smart city initiatives divided in three big types, across strategic domains. This can serve as a basis to get idea but should be elaborated on during stakeholder workshops.

- *Business Solutions and implementations*
  - ***Urban Planning Application** will create a virtual space for consultation and participation where interested stakeholders can exchange information on urban development projects, understand proposed visions for the city and experience potential developments first-hand.*
  - ***Other examples:** IT & Telecom integration, Integrated architecture for building, security and power management, traffic management, Parking,…*
- *Environment Solutions and implementations*
  - ***Smart Environment Application** will integrate new and existing technologies to help households to reduce their carbon consumption. A range of Internet of Things data collectors will measure environmental factors such as electricity usage, temperature and gas consumption to provide households with a snapshot of their energy use.*
  - ***Other examples:** Water Network Management, Urban Flooding Management, Street lighting solutions*
- *People Solutions and implementations*
  - ***Relocation application** will help users to find a place to live in a city by enabling them to perform queries to find certain locations in the city according to specific constraints. Query results will be visualized on a map and in an augmented reality environment.*
  - ***Other examples:** Asset Management, E-governance, Mobile payments,…*

It should be noted that this list is not exhaustive and that there is a lot of literature to get inspiration for the smart city initiatives. And it should be remembered that the best source of inspiration is the voice of the inhabitant.>>

6. Conclusions

<< Provide a summary of the smart city strategy and strategic initiatives that are described in this document. This paragraph should provide a short answer to the following questions:

- *Are there opportunities within the city for developing smart city initiatives?*
- *What are the strategic focus areas for the city?*
- *Which actions will be taken within the different focus areas for the following periods? >>*

TEMPLATE

Project Acronym: **EPIC**

Grant Agreement number: **270895**

Project Title: **European Platform for Intelligent Cities**

EPIC Roadmap for Smart Cities

Template 2: Vision Phase – EPIC Smart City Business Case

Version: 0.1

Authors:

Project co-funded by the European Commission within the ICT Policy Support Programme		
Dissemination Level		
P	Public	
C	Confidential, only for members of the consortium and the Commission Services	

1. Executive Summary

<< Provide a short summary of this document, including a summary of the city context (including strategy), the opportunities and evaluation results in terms of the EPIC platform and services, and the implementation of the proposed solutions. >>

2. Introduction

<< Describe the city context and strategy that initiated the development of this business case document. Describe the vision, the key issues and the value proposition for the city. Highlight the needs and requirements for the city to becoming a smart city. >>

<< Indicate the questions that should be answered in this document, for example what are the benefits, opportunities, challenges and risks associated with providing smart city services (using the EPIC platform)? >>

2.1 Purpose of this Document

Based on the city context and strategy, the business case will provide a description of identified and evaluated opportunities for the implementation of smart city services. These opportunities are proposed based on an analysis of the EPIC platform and solutions for providing such smart city services. A clear value proposition should be developed for the city in order to move to the next phase of implementation.

This business case document will form the basis for the implementation of smart city solutions, using the EPIC platform. The intended audience of this document includes the city administration and citizens / businesses operating within the city.

2.2 Content of this Document

This document provides a detailed description of the aspects constituting a business case, including the following:

- The opportunities and options for providing smart city services
- The evaluation of the proposed opportunities
- The implementation of the selected opportunities

These aspects are described in more detail in the following chapters.

3. Opportunity Analysis

<< Indicate the analysis of possible opportunities related to the city context and strategy, for providing smart city services using the EPIC platform. Take the important steps from the business case development approach as described in detail in Annex II. >>

3.1 Positioning of EPIC

<< Describe the general objectives of the city related to their digital strategy and to becoming a smart city. These objectives could include cost improvements, better public service delivery, better involvement of citizens and businesses, etc. >>

<< Describe the common business drivers for moving towards cloud based solutions. Use the description of possible external or internal business drivers. Indicate the value proposition of the EPIC platform and services in providing a cloud based solution for delivering smart city services to citizens and businesses. >>

3.2 Proposed EPIC Solution

<< In this section, the EPIC solution is described in more detail in order to provide an answer to the what, why and how questions. The proposed EPIC solution should already align with the city context and strategy, and the general objectives of the city. This part of the document has as an objective to put all stakeholders at the same level of understanding of the EPIC solution, the benefits and the costs. >>

3.2.1 EPIC Solution Description

<< Describe the concrete smart city services that would be provided to citizens and businesses on the EPIC platform. >>

<< In order to assess the alignment between the EPIC solution value proposition, the Smart City Strategy and the available resources (money, people, technology), an EPIC Smart City assessment tool has been created. This assessment tool looks in more detail towards four domains, i.e. Strategic/legal, Financial, Technical and Operational. The person (or people) performing the assessment should have good knowledge of the EPIC Platform capabilities and the city's capabilities. This assessment model is described in more detail in appendix.>>

<< Once the assessment turns out to be positive, the stakeholders can continue and describe the possible business and service models for the operation of the EPIC services and the EPIC platform, related to the overall EPIC organization, the city administration and the related SMEs. >>

3.2.2 Benefits

<< Highlight and describe in detail the benefits of providing the smart city services on the EPIC platform. These benefits should align with the general objectives, the context and the strategy of the city. Some examples of benefits can be found in Annex. >>

- *Qualitative Benefits*

Category	Description
Business Organization	• Organizations assume roles that are traditionally given to companies focused **solely on IT** • Organizations can **provide multiple services** to a customer in addition to their primary service, allowing for more business to be conducted
Image – Brand Perception / Positioning	• Organizations are seen at the **forefront of their respective industries** for providing Cloud Services • Customers learn to associate the organization with **change**, being **new and innovative**, and being an **industry leader** • Helps **attract and retain** the best employee talent; employees are drawn to companies that **make an impact**
Business Diversification	• Depending on the nature of Cloud Services Implementation, companies can **diversify themselves** as **protection against competition** in other areas • Can enter **adjacent markets** that may have been previously unplanned
Innovation Ecosystem	• Organizations that become Cloud Service Providers create an **ecosystem** that enables future innovation • Allows them to easily **test, launch, and maintain** their services

- *Quantitative Benefits*

Category	Description
Lower Operating Costs	• Offering products via Cloud, (i.e. SaaS), can result in **lower costs** as software is **delivered via internet** and not physically • Streamlines Operating Model and scales with user base • Cloud computing leverages economies of scale and uses consolidated, centralized computing resources to minimize ICT cost • A Brookings Institution study pegs cloud-specific public agency savings at 25–50%
Increased Revenue	• Cloud tends to attract more users since it is not only **innovative**, but also tends to **cater to user needs** (e.g. on demand, accessible anywhere, etc.) • An increase in users results in **increased revenue** • Subscription based model is **preferred by users** and results in a **continuous income stream**
Market Share	• Cloud allows companies to reach an **increased number of users** easier as products and services are delivered via Cloud and not physically • When compared to competitors, especially those who do not provide Cloud Services, this leads to a **large increase** in market share

Redefines Value Chain	• Focus on **business critical efforts** • Get best of breed services to get **high quality service** as well as **reduce lag time** • Supports resource sharing between and among units while preserving their independence and data integrity • Simplifies collaboration within and between governments and helps identify and implement best practices

3.2.3 Financial Plan

<< Based on the business and service models for the EPIC solution, a detailed financial plan should indicate the costs and returns related to the implementation and operation of the smart city services. In the financial plan, the impact is described of the EPIC solution on the budgets and costs related to the IT operations of the city. In Annex some key elements to take into consideration for the financial plan can be found. >>

3.2.4 Organisational and Process Impact

<< Indicate the necessary organisational and process changes within the city for implementing the EPIC services on the EPIC platform. >>

Entity	Impact
City Management	- Appreciate dynamic and ambitious nature of EPIC platform - Support aligning IT with business on smart city strategy - Understand industry and necessary business model changes
CIO and IT Directors	- Have a desire to be involved in business strategy - Appreciate operational efficiency - Understand risks and necessary compliance requirements
HR	- Support re-allocation of IT resources - Implement and execute any necessary IT training
IT Staff	- Flexible with transition towards EPIC and services - Have physical resources necessary for EPIC integration - Be prepared to provide internal and external support relating to EPIC and services

3.2.5 Risks

<< Describe the potential issues and risks that could prevent the city from implementing the smart city services using the EPIC platform. These risks could potentially relate different

domains and aspects, such as data control, security and privacy, tax and legal, vendor lock-in, IT operations and readiness, etc. >>

Risk	Issue	Result of Inaction
Geography	From where are our customers going to access our Cloud Services?	Countries have different restrictions and could limit customers from using or accessing Cloud Services.
Data Controls	Who owns the data? How is it to be used? Are controls in place?	Possible risk of data being accessed by the wrong person. Could result in data abuse.
Multi-tenancy	Are we going to put data from multiple customers onto the same server?	Risk of users gaining unauthorized access to other users' data and possibly launching attacks.
Security and Privacy	How is security achieved? What is the level of privacy protection?	Data could be stolen. Would result in reduction of organization's image and potential loss of customers as well as possible compliance issues.
Data Seizures	Do we have systems in place to segment different users' data?	A server seizure for one company could result in loss of data or data disclosure for another company if the data is not isolated from each other.
Back Up and Disaster Recovery	Are data backup, retention, and disaster recovery practices sufficient?	Possible irreversible loss of data
Audit and Assurance	Are there risk management controls to applications and data?	Without any controls and checks, the chance to be non-compliance significantly increases
Tax and Legal	Can you meet needs for legal compliance and tax issues?	Potential compliance issues

3.2.6 Assumptions and Constraints

<< Describe the identified assumptions and constraints for implementing the smart city services on the EPIC platform for the city. These assumptions and constraints can relate to the technical, organisational, financial or other aspects of the EPIC solution or the city administration. >>

4. Evaluation

<< Describe the evaluation of the EPIC solution, in terms of a qualitative and a quantitative analysis. This evaluation should provide an answer to the following questions:

- *Does the city need the proposed EPIC solution? (qualitative analysis)*
- *If yes, what would be the proposed business and service models for the EPIC solution? (quantitative analysis)*

>>

<< Based on the evaluation, a conclusion could be provided on the need for the implementation of the EPIC solution which would be a decision to be taken by the city administration. >>

5. Implementation

<< Based on the description of the EPIC solution, a high-level implementation plan should be described. This implementation plan should describe the necessary aspects for taking the next steps in implementing the smart city solutions for the city. This should answer the what, who, how, when, where, with questions. This plan will be the main input for the development of the project charter. >>

5.1 Stakeholders

<< Identify and describe the main stakeholders for the implementation and operation of the smart city services on the EPIC platform. >>

5.2 Approach

<< Describe the general methodology to be used for the implementation and operation of the EPIC services and platform. Describe the high-level steps and activities to be performed and results to be achieved in order to implement the EPIC services. >>

5.3 Resources

<< Identify the high-level resources (in terms of labour and material) that would be required for the implementation and operation of the EPIC solution. >>

5.4 Budget

<< Related to the financial plan, indicate the high-level budget that is required for the initial implementation, set-up, and operation of the EPIC services and platform. This budget will be described in terms of the project to deliver the EPIC services and the ongoing operational costs of project end. >>

5.5 Planning

<< Describe the high-level planning of activities and milestones for the implementation and operation of the EPIC solution. >>

5.6 Results

<< Describe the necessary results to be obtained in the project and the ongoing operations of the EPIC solution. >>

5.7 Critical Success Factors

<< Describe the conditions and factors that will determine the success of the implementation of the EPIC solution. >>

5.8 Risk Mitigation

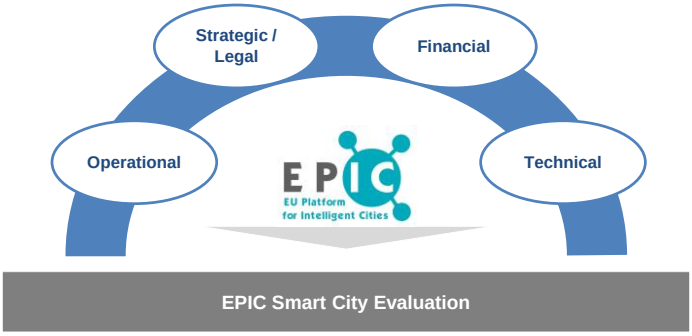
<< Describe the high-level steps, roles and responsibilities for the identification, definition and mitigation of potential risks related to the implementation of the EPIC solution. >>

6. Conclusions

<< Provide a short description of the proposed solution, the evaluation and the possible next steps in the implementation of the smart city services. >>

Annex I: EPIC Readiness Assessment for Smart City

<< Perform an assessment of the city's readiness to provide a service via the EPIC cloud platform. The assessment is done across four areas, Strategic & Legal, Financial, Operational and Technical. The idea is to give an answer (no or yes) on a very specific question. This can then be translated to a score, which can be aggregated across different levels to indicate the City's readiness; the higher the score, the readier the city for implementation of the service via EPIC. The questions indicated in the assessment are not an exhaustive list, but a enough to give a first indication. >>



Evaluate the readiness of a specific city for the adoption of the EPIC platform and services

Strategic / Legal	
Evaluate the strategic fit and legal readiness for adopting EPIC:	
• S1. Strategic impact and stakeholders	○
• S2. Alignment with Smart City domains	○
• S3. Governance and compliance	○
• S4. Restrictive legislation or obligations (data, privacy, storage, etc.)	○

Financial	
Evaluate the financial opportunities and constraints for adopting EPIC:	
• F1. Financial requirements or restrictions	○
• F2. Procurement and contracts	○
• F3. Budget allocation and sourcing	○
• F4. Future prospects and migration	○

Operational	
Evaluate the operational impact and constraints for adopting EPIC:	
• O1. Management and governance structure	○
• O2. Process alignment	○
• O3. Resources and skills available	○
• O4. Service level requirements	○

Technical	
Evaluate the technical requirements and constraints for adopting EPIC:	
• T1. Application and system architecture	○
• T2. Technical standards and frameworks	○
• T3. Security	○
• T4. Infrastructure	○

Strategic / Legal

Evaluate the strategic fit and legal readiness for adopting EPIC

Strategic and Legal	Answer	Score (0-4)
S1. Strategic impact and stakeholders		
S1.1. Does implementing the service via EPIC align towards your business value drivers?	*No (0) - Yes (4)*	
S1.2. Is the proposed service via EPIC more supporting than business critical?	*No (0) - Yes (4)*	
S2. Alignment with Smart City domains		
S2.1. Based on the strategy assessment, is the level of alignment between the proposed service via EPIC and one or more of the strategic domains high?	*No (0) - Yes (4)*	
S3. Governance and compliance		
S3.1. Is there a Governance model in place that has the ability to manage and enforce the governance of the cloud services across the city and stakeholders?	*No (0) - Yes (4)*	
S3.2. Are there any risk management or compliance requirements for any functions/applications? Does EPIC allow to meet these requirements?	*No (0) - Yes (4)*	
S3.3. Is there a low level of requirements to achieve both internal and external audit compliance for the service via EPIC in scope?	*No (0) - Yes (4)*	
S4. Restrictive legislation or obligations (data, privacy, storage, etc.)		
S4.1. Is there a low level of personally identifiable data involved in the service via EPIC?	*No (0) - Yes (4)*	
S4.2. Is the service in scope minimally subjected to regulations that make security controls which adequately safeguard the confidentiality of data paramount?	*No (0) - Yes (4)*	
Overall Score for Strategic and Legal		

Financial

Evaluate the financial opportunities and constraints for adopting EPIC

Financial	Answer	Score (0-4)
F1. Financial requirements or restrictions		
F1.1. Is there a clear view on the financial benefits (if applicable) of the service via EPIC?	*No (0) - Yes (4)*	
F1.2. Is there a clear view on the financial costs of the service via EPIC?	*No (0) - Yes (4)*	
F.1.3. Has the cloud solution been compared to other solutions and does it make more financial sense to choose cloud?	*No (0) - Yes (4)*	
F1.4. Is the break-even point, ROI, IRR or other ratio in line with the city's financial goals?	*No (0) - Yes (4)*	
F1.5. Are there enough financial resources available to guarantee implementation and operations?	*No (0) - Yes (4)*	
F2. Procurement and contracts		
F2.1. Is there a clear view on the preferred way of procuring the service via EPIC?	*No (0) - Yes (4)*	
F2.2. Are there already contracts in place that enables an acceleration of the procurement process?	*No (0) - Yes (4)*	
F2.3. Is the way the service via EPIC can be procured in line with the city's policies?	*No (0) - Yes (4)*	
F3. Budget allocation and sourcing		
F3.1. Is the budgetary forecast in line with the expected implementation plan?	*No (0) - Yes (4)*	
F.3.2. Is there a sourcing function in place to guarantee the financial follow-up of supplier(s) relationship(s)?	*No (0) - Yes (4)*	
F4. Future prospects and migration		
F.4.1. Is the current investment in line with the long term financial plan of the city?	*No (0) - Yes (4)*	
F.4.2. If there already exist similar services, does the migration to a new cloud-enabled service justify the costs?	*No (0) - Yes (4)*	
Overall Score for Financial		

Operational

Evaluate the operational impact and constraints for adopting EPIC

Operational	Answer	Score (0-4)
O1. Management and governance structure		
O1.1. Is there a Governance model in place that has the ability to manage and enforce the governance of the cloud services across the city and stakeholders?	*No (0) - Yes (4)*	
O1.2. Are there clear governance mechanisms in place to enforce the governance model (e.g. roles & responsibilities, communication plan, processes, documents)?	*No (0) - Yes (4)*	
O.1.3. Is the impact of using Cloud acceptable for the organization (business and IT)?	*No (0) - Yes (4)*	
O2. Process alignment		
O2.1. Are the processes to be supported fit for a cloud solution? E.g. Not too many manual steps, bit business critical?	*No (0) - Yes (4)*	
O2.2. Do the business requirements demand for a high elasticity of the system?	*No (0) - Yes (4)*	
O.2.3. Does the service need to be randomly accessible (i.e. accessible a web service (on premise, mobile, etc.)?	*No (0) - Yes (4)*	
O3. Resources and skills available		
O3.1. Is there the possibility to have a dedicated Cloud Services function responsible for Cloud service management?	*No (0) - Yes (4)*	
O3.2. Are the skills available for Cloud service management?	*No (0) - Yes (4)*	
O4. Service level requirements		
O4.1. Is there a clear and documented view on the service levels that the cloud solution has to offer towards the stakeholders?	*No (0) - Yes (4)*	
O4.2. Does the service have low performance requirements?	*No (0) - Yes (4)*	
O4.3. Are there low SLA & Availability Requirement?	*No (0) - Yes (4)*	
Overall Score for Operational		

Technical

Evaluate the technical requirements and constraints for adopting EPIC

Technical	Answer	Score (0-4)
T1. Application and system architecture		
T1.1. Are there mature solutions available for cloud deployment to cover the business needs?	*No (0) - Yes (4)*	
T1.2. Does the system have a low integration complexity?	*No (0) - Yes (4)*	
T2. Technical standards and frameworks		
T2.1. Does the EPIC platform adhere to Technical standards and frameworks that are part of the city's IT strategy and operation?	*No (0) - Yes (4)*	
T3. Security		
T3.1. Does the EPIC platform adhere to Security standards that are part of the city's IT strategy and operation?	*No (0) - Yes (4)*	
T4. Infrastructure		
T4.1. Does the service have high scalability requirements?	*No (0) - Yes (4)*	
T4.2. Does the service have low performance requirements?	*No (0) - Yes (4)*	
T4.3. Does the service have low data transfer requirements?	*No (0) - Yes (4)*	
Overall Score for Technical		

<< Indicate the summary of the assessment above. Provide a simple overview of the key elements that lead to the decision of using EPIC or not. >>

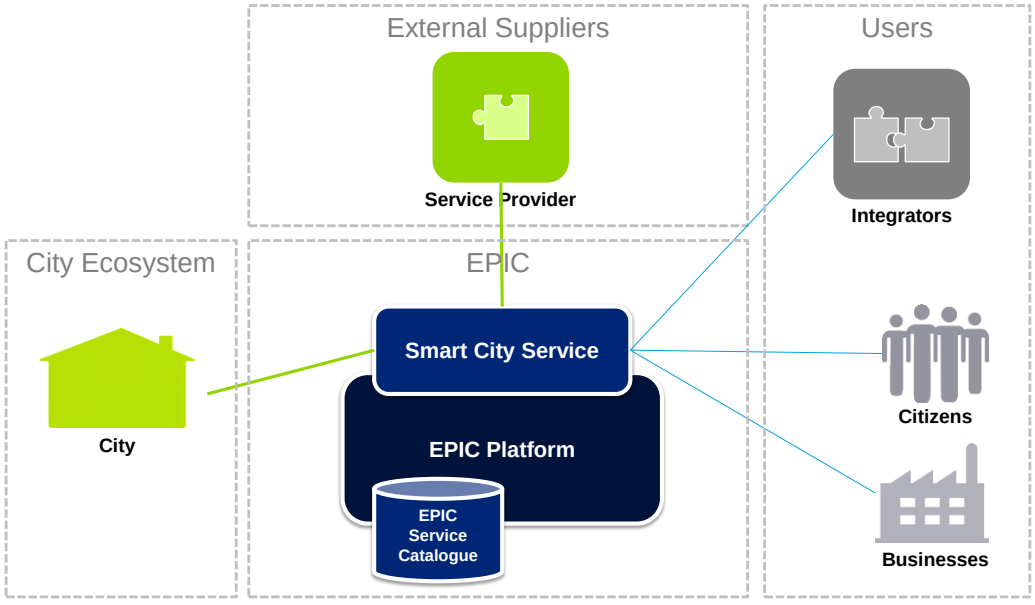
Annex II: Financial Models for EPIC Service Implementation

<< In this annex an overview of financial considerations is given in order to support the development of a financial plan for the justification to use a cloud-based solution and the EPIC platform.

When looking at the financial implications of the implementation of a service via EPIC, it is worthwhile to look at the difference between 'in-house' and 'PaaS' delivery models.

In the case of 'in-house', the full development, deployment and support of the application is under the responsibility of the city. Next to the hardware components, such as switches, storage devices, physical servers, and the software components, such as RDBMS software, monitoring tools, the human activities play a very important role in the total cost.

If the city chooses the EPIC platform (Platform as a Service – PaaS), it has to realize that certain responsibilities will be transferred, but that other activities will remain and will even grow in importance, due to an increased focus on governing the third party. >>



In the following two paragraphs, a more detailed view on cost structures and financial benefits related to the EPIC platform and services are provided.

1. Cost Structure for EPIC

As an important element in every business model, the financial implications and especially the cost structures should be investigated and understood clearly. The cost structure provides the most important monetary consequences while operating under different business models,

including both fixed and variable costs. In the following figure, an overview is provided of the identified cost components for an EPIC service.

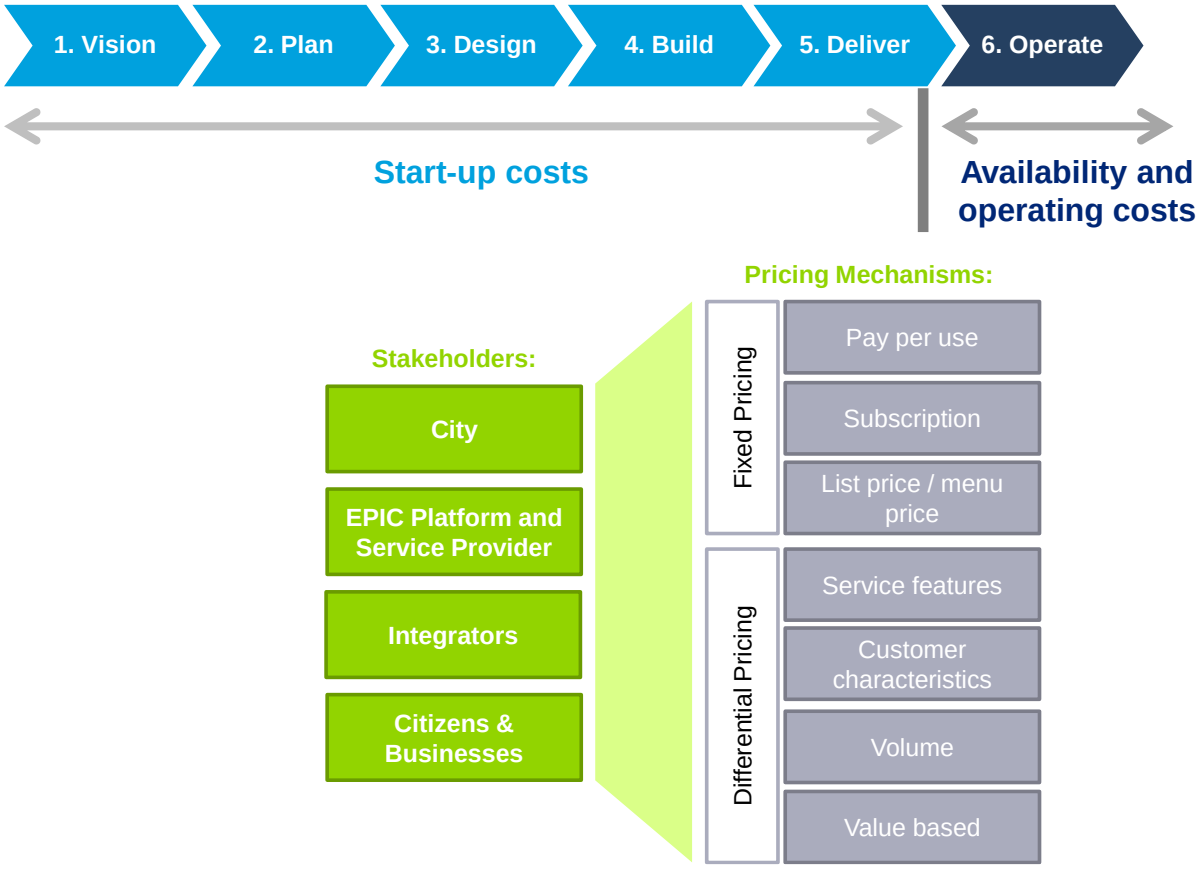


Figure 14 – Cost Structures for Developing EPIC Services

*First, there is a **cost for starting-up** the service but it is charged only once. There may be also additional one-time charges if the service has some attributes that customer is able to change after the service is implemented and bring additional work to the services provider.*

In the context of a city, the following possibilities (non-exhaustive) of financing can exist:

- ***Private-Public Participation:** the idea is that there exists a close collaboration between the city and one or more private partners to develop and finance a new service / application. To ensure a good working relationship, there has to be a clear benefit for both parties: for the private partner the direct or future revenue stream should be clear, for the city it can be that qualitative elements are more important.*
- ***License based:** there is no direct collaboration between the city and another party. The city will "procure" an application, which can be out of the box, open-source, free of charge, etc. There can be (limited) costs related to the fine-tuning of the application if necessary.*

- ***Private initiative:*** *a dedicated supplier for the application is allowed to provide the service for the city. The costs and the revenue will be for the private party, with the city actively promoting the use of the application to improve service delivery for the inhabitants, visitors, employees or others.*

It's clear that manner in which the city desires to obtain the application / service has an important influence on the overall financial model.

For the operating costs, the following model is suggested:

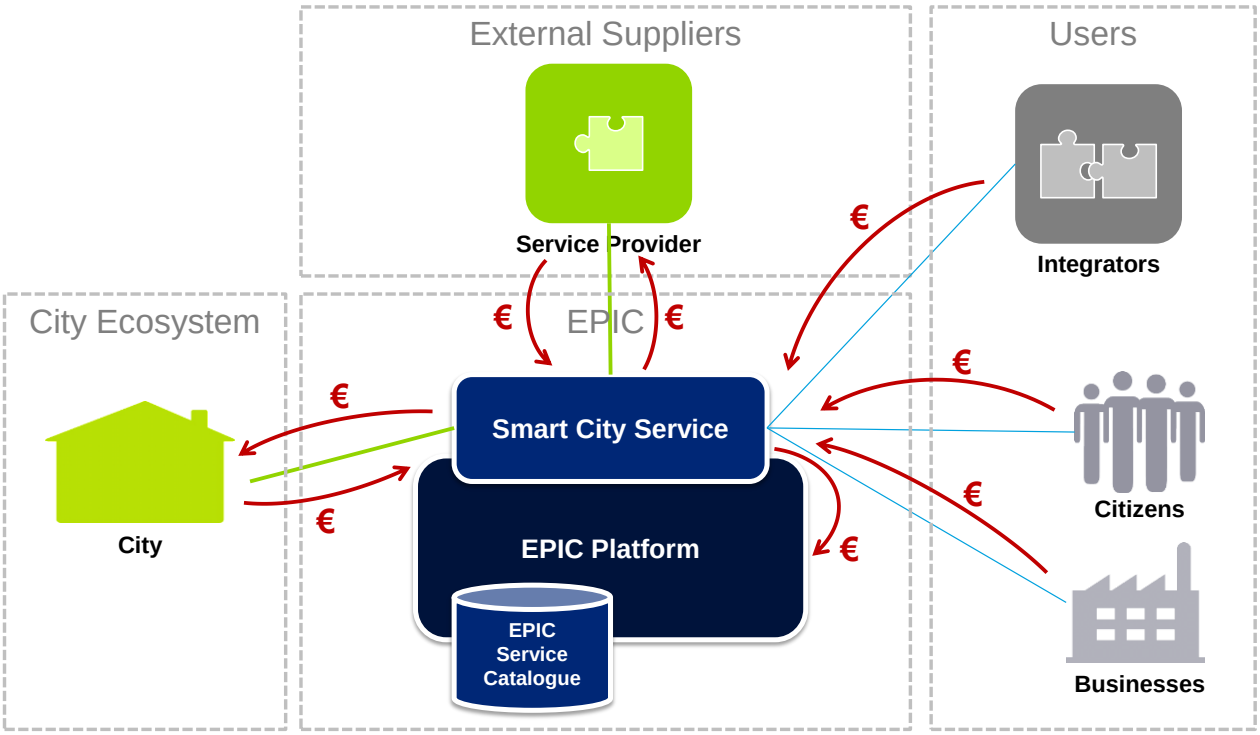


Figure 15 - Proposed Structure for Identifying Costs and Pricing Mechanisms

The operating cost price component is mostly variable whereas availability and start-up components are mostly fixed. However, also the capacity units have a fixed unit price. It is possible that the price for capacity units is set according to customer commitment. For example, the price could be cheaper if the customer contracts to use the service for a longer period such as one year.

There is an ***availability cost*** *that incurs even if the customer does not use the service. For example, in case of an e-mail service, availability is the cost that incurs from having the mailbox and ability to send e-mail even if the user does not actually send any e-mail. The pricing mechanism for availability component is subscription, which means that the customer signs a contract for using the service for a certain period such as a month, etc.*

*The third price component is the **actual operating cost** of the service and it is the biggest element. The use of the cloud service is priced with a pay per use pricing mechanism. There is some predefined capacity unit to be measured and a customer pays in relation to his actual usage of capacity.*

Though there should be also a breakdown of costs attached. It would be also beneficial to the customer to be able to follow the development of the operating cost in real-time via the EPIC administrative web portal, but this will only be possible when such admin unit is made readily available of course.

Some specific activities and costs remain or come into play when choosing for a cloud-based solution. Some examples to illustrate this:

- ***Mobile applications:** If the city wants to make a mobile application available via Apple's appstore, it will need to have a Developer's ID which cost 80€ / year.*
- ***Vendor Management:** When working with third parties, the vendor management function becomes increasingly important to select the right vendor, follow-up on contract negotiation, checking SLA's, rationalizing different vendor contracts, etc. This will come at an extra cost.*
- ***Demand Management:** Demand management activities will need further reinforcement as it is key to have the business demand and the technical specifications crystal clear before talking to external service providers.*
- ***Implementation and operations:** In most of the cases a Database Management System (e.g. Oracle, MySQL) is provided. The city will need to provision the database, create tables, and add data. Next to this the city will need to develop, test and deploy the application on the PaaS environment. If the environment on which the application is deployed experiences problems, the provider will have to take care of this. If there are necessary updates on the OS or the DBMS, the provider will take care of this.*
- *…*

Next to the cost structures for EPIC, an important aspect is the way the service will generate revenue for the city (if this is an objective) and/or related providers.

1. Pricing Mechanisms for Users

*Vis-à-vis the **End-user / Client** there are two major decisions for the city to take:*

a. *Is the end-user going to be charged for the use of the service / application?*
b. *If so, what is the pricing mechanism that will be used?*

For the customers it is observed that there is a need to decrease the proportion of capital expenditures (CAPEX) and increase the proportion of operational expenditures (OPEX) in IT.

To meet this need, and to of course (partially) finance the service provisioning, the city can use several pricing mechanisms. The (theoretical) manners are shown hereunder. The decision for

the pricing mechanism is up to the city's stakeholders, but a generic EPIC pricing mechanism is available:

Category	Pricing Mechanism	Description
Fixed Pricing	**Pay per use**	Customer pays in function of the time or quantity he consumes of a specific EPIC service.
	Subscription	Customer pays a flat fee in order to access the use of a product or to profit from an EPIC service.
	List price / menu price	A fixed price that is often found in a list or catalogue.
Differential Pricing	**Service feature dependant**	Price is set according to service configuration. Includes also bundling of different services.
	Customer characteristic dependant	Price is tailored to the characteristics of every single customer.
	Volume dependant	Differentiates prices on the basis of purchased volumes.
	Value based	The final price will strongly depend on the customer's valuation of a value proposition.

The benefit of such a pricing model is that it balances the commitment between the EPIC platform provider, the service provider(s) and the city/customer. This is because the customer's commitment is greater than compared to the raw pay-per-use pricing mechanism. The proposed pricing model is valuable from a service provider's viewpoint also because it has fixed-term subscription components that increases customer's lock-in and possibly stimulates closer relationship between customer and the service provider.

Although the proposed model may be suitable for most of the EPIC services, it is clear that formulating a generic pricing mechanism may be insufficient in some cases. Therefore, the proposed generic pricing mechanism might better serve as a basis for service-specific pricing mechanisms.

2. Costs and Pricing Mechanisms for EPIC

To give a general indication related to the costs and drivers, an overview for three major PaaS providers is included. Next to this, the EPIC costs of use should be included.

	Force.com	Google (App Engine)	Amazon (AWS)	EPIC
Number of Users	Unlimited	Unlimited	Unlimited	?
Number of Apps	Unlimited	Unlimited	Unlimited (pricing varies)	?
Included Tools	Accounts, Contacts, Chatter, Approvals, Process Visualizer, Workflow	Mailbox, document management, chat, mobile sync, Google Indexing, Google Apps, SQL databases, SSL and access to advanced Google services	Elastic Compute Cloud, CloudFrontSimpleDB, Fulfillment Web Service (FWS), Chat, Flexible Payments Service (FPS)	?
Database Objects	2000	Unlimited Entity creation using BigTable	NA	?
Developer Sandboxes	Yes (Full copy including data)	Limited	Limited	?
List Price / User / Month	$75	$8/user/month to a maximum of $1000/month and unlimited number of users	Calculated based on data transfers and storage (i.e., 0.10-0.17 per GB, 0.12-1.20 per hour)	?

The above mentioned table provides an overview of the costs related to the use of PaaS and the EPIC platform. Next to this another important cost is the cost of the service / application the city wishes to deploy on this EPIC platform.

3. Pricing Mechanisms for Suppliers

It is possible that the city does not put financial benefits as an objective. If the only thing that is necessary is to provide a service to inhabitants and that a budget is foreseen, the city will only need to look at the costs and how these can be minimized. However in many cases, it can be interesting to think about the ways revenue can be generated.

When looking at the EPIC ecosystem, there are three "external" stakeholders when looking at things from a city's point of view:

- *Supplier of External data*
- *End-User / Client*
- *PaaS / EPIC provider*

The latter one will never generate revenue in a normal business model. The two others can generate revenue.

*The **supplier of external data** will most likely charge costs, but it can also generate revenue in the service's ecosystem. Some examples illustrate this:*

- *Real estate agencies want to be integrated in the relocation application of a city. This means a win-win situation for both parties: the city has access to more real estate, and the agencies have an extra communication channel, for which they obviously can be charged.*
- *A touristic application where hotels appear on the touristic map. The latter is powered by e.g. booking.com and for every booking done via this way the city is entitled to a percentage of booking.com's revenue.*
- *…*

It is clear that two aspects are very important to guarantee this kind of revenue generation, namely strong negotiation skills from the city's part and a stable application / service ecosystem.

TEMPLATE

Project Acronym: **EPIC**

Grant Agreement number: **270895**

Project Title: **European Platform for Intelligent Cities**

EPIC Roadmap for Smart Cities

Template 3: Vision Phase – Change Management Roadmap Tool

Version: 0.1

Authors:

Project co-funded by the European Commission within the ICT Policy Support Programme		
Dissemination Level		
P	Public	
C	Confidential, only for members of the consortium and the Commission Services	

1. Introduction

An EPIC project is a project undertaken by a city or city administration to take up the EPIC platform to develop, transform and evolve smart city services in order to become a smart city. For an EPIC project, the EPIC roadmap describes the planned series of actions, tasks and steps to achieve the objectives that are documented in an EPIC Smart City project management plan.

The change management roadmap provides a method for cities or city administrations to manage change in the course of the EPIC project. The change management roadmap provides objectives, an approach and possible actions for each EPIC project phase.

1.1 Purpose of this Document

Based on the project management plan in the EPIC roadmap, this change management roadmap supports the concrete and practical execution of change management throughout the different phases of the project. The change management roadmap covers the objectives, approach and tasks to be performed per project phase.

The change management roadmap needs to be approved by the project sponsor and leadership during project planning, and is applied throughout the life of the project.

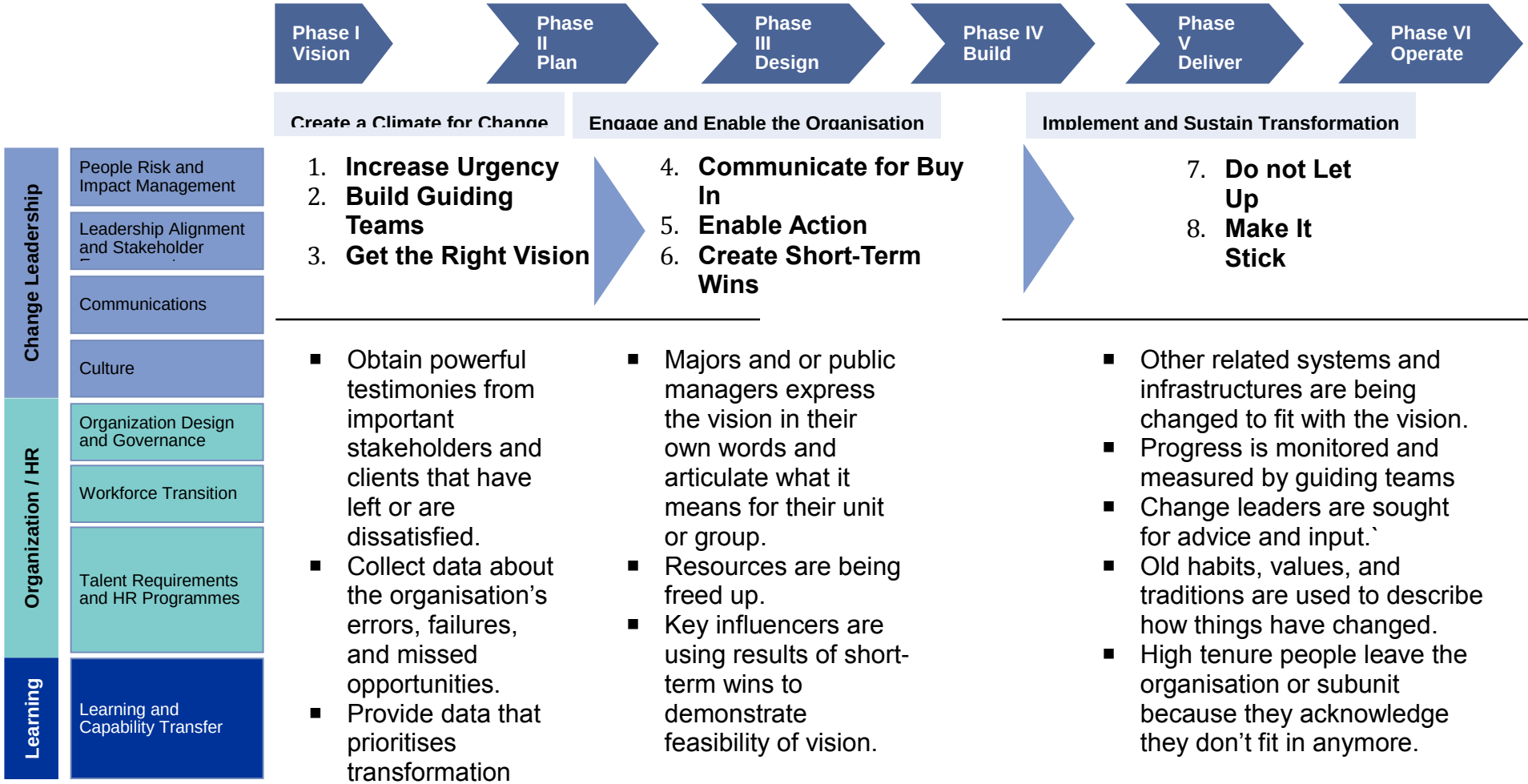
1.2 Content of this Document

This document provides a description of change management objectives, approach and possible actions per project phase.

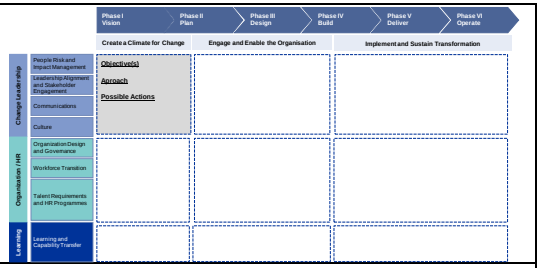
Some definitions to take into account are depicted hereafter:

Client	Following the New Public Management theory, the public/citizen requesting services is to be considered as a client. The public service will develop client oriented strategies and approaches in order to best serve the customer of their offerings.
Internal and external stakeholder	Internal stakeholders within the specific context of local governments can be defined as follows: - Internal stakeholders: all staff and others involved in the local government as an organisation - External stakeholders: all parties having an interest in the services and policies performed by the local government.

2. Change Management Roadmap Applied to EPIC


Phase I Vision
Phase II Plan
Phase III Design
Phase IV Build
Phase V Deliver
Phase VI Operate
Create a Climate for Change
Engage and Enable the Organisation
Implement and Sustain Transformation
Change Leadership
Organization / HR
Learning
People Risk and Impact Management
Leadership Alignment and Stakeholder
Communications
Culture
Organization Design and Governance
Workforce Transition
Talent Requirements and HR Programmes
Learning and Capability Transfer
1. Increase Urgency
2. Build Guiding Teams
3. Get the Right Vision
4. Communicate for Buy In
5. Enable Action
6. Create Short-Term Wins
7. Do not Let Up
8. Make It Stick
Obtain powerful testimonies from important stakeholders and clients that have left or are dissatisfied.
Collect data about the organisation's errors, failures, and missed opportunities.
Provide data that prioritises transformation activities and points to specific areas that need to change.
Identify key enablers for the change.
Gather explicit statements about desirability.
Majors and or public managers express the vision in their own words and articulate what it means for their unit or group.
Resources are being freed up.
Key influencers are using results of short-term wins to demonstrate feasibility of vision.
Other related systems and infrastructures are being changed to fit with the vision.
Progress is monitored and measured by guiding teams
Change leaders are sought for advice and input.`
Old habits, values, and traditions are used to describe how things have changed.
High tenure people leave the organisation or subunit because they acknowledge they don't fit in anymore.

Objectives



- Build the right vision
- Increase the urgency of the change
- Build guiding teams

Approach

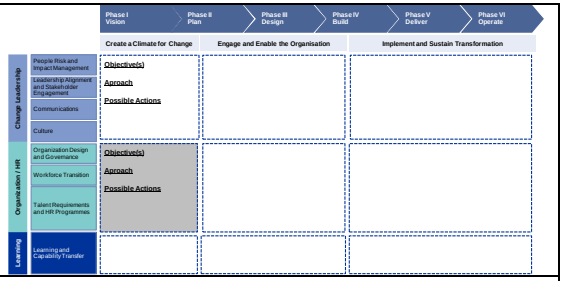
- People Impact and Change Risk Analysis
- Plan Leadership / Stakeholder Alignment Assessment & Goals
- Assess Communications Management
- Define Culture Assessment Scope and Approach

Possible actions (non-exhaustive)

- Map the stakeholders (internal and external) and leadership required to go through the change action
- Develop a change readiness plan based on the level of change readiness of the organisation
- Appoint change agents and deploy them in the organisation
- Develop a change leadership programme
- Define the communications and change landscape
- Perform a stakeholder (internal and external) analysis/mapping

Objectives

- Build the right vision
- Increase the urgency of the change
- Build guiding teams



Approach

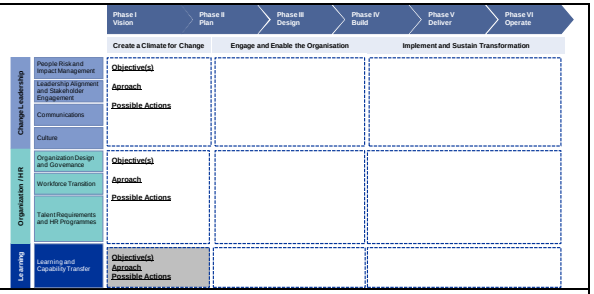
- Define operating model requirements
- Assess the organisation structure
- Assess the support processes (HR, Finance, etc.)
- Assess the talent management

Possible actions (non-exhaustive)

- Organise workshops with all layers of staff in order to set out the operating model requirements
- Perform an organisational structure assessment
- Perform benchmarking on the core support processes and look for efficiency gains
- Conduct a staff satisfaction survey including questions on talent, incentives and staff motivation

Objectives

- Build the right vision
- Increase the urgency of the change
- Build guiding teams



Approach

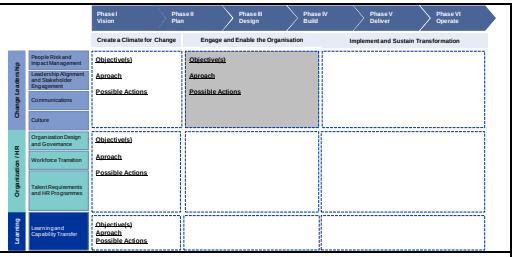
- Define training needs based on the changes proposed
- Assess the capabilities and competencies and define future needs

Possible actions (non-exhaustive)

- Conduct a training needs assessment
- Assess whether the current training plan is sufficiently preparing the staff and if necessary adjust the training plan

Objectives

- Communicate for Buy In
- Enable Action
- Create Short-Term Wins



Approach

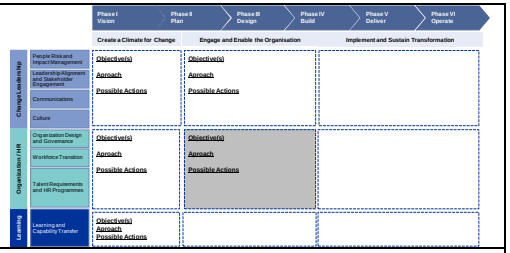
- Define behaviour that will change the behaviour
- Impact analysis
- Integrated communications approach
- Align stakeholders
- Define culture
- Risk mitigation
- Start communication with key stakeholders

Possible actions (non-exhaustive)

- Conduct an impact analysis and define the major change initiatives to be taken
- Develop and integrated communications plan and key messages to be sent to the internal and external stakeholders
- Do a culture assessment
- Gather internal and external stakeholders in and present and integrated change plan-i.e. key messages
- Develop a risk mitigation action plan
- Create communication/change toolkits for the leadership

Objectives

- Communicate for Buy In
- Enable Action
- Create Short-Term Wins



Approach

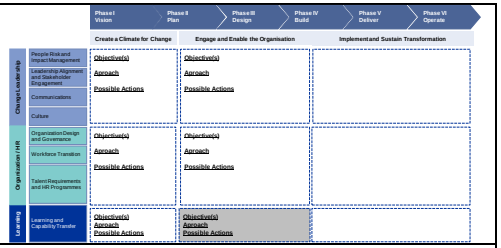
- Define HR/ change programme
- Define impact on the organisation
- Define future state operating model
- Set up a skills inventory
- Develop organisation and workforce transition plan
- Perform job planning bearing in mind the specific context (staff regulations, …)

Possible actions (non-exhaustive)

- Perform an organisation impact assessment and review them in (staff/stakeholder) sessions
- Define and describe the functional roles and responsibilities and accompanying jobs and skills profiles
- Develop and organisation and workforce transition strategy and plan
- Develop an integrated rewards strategy and programme

Objectives

- Communicate for Buy In
- Enable Action
- Create Short-Term Wins



Approach

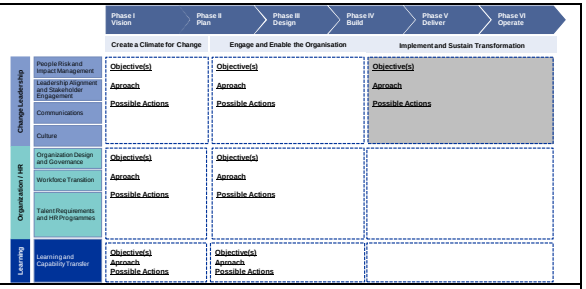
- Design role and position mapping process
- Finalise the end user curriculum and training programme
- Test and conduct the training

Possible actions (non-exhaustive)

- Determine the training logistics
- Create a training environment
- Conduct train-the-trainer activities
- Finalise training material

Objectives

- Do not Let Up
- Make It Stick



Approach

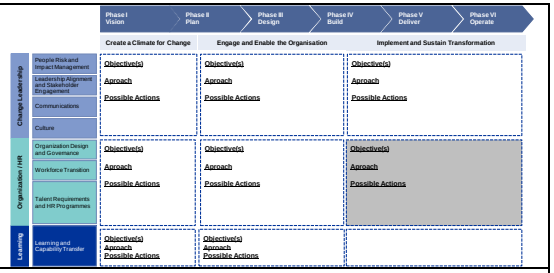
- Monitor and reassess the risk mitigating actions
- Monitor the change readiness programme
- Transition the change and communication responsibilities to the internal staff
- Manage change activities

Possible actions (non-exhaustive)

- If needed, take risk mitigating actions
- Perform lessons learned workshops
- Develop a post implementation change leadership and adoption plan/activities
- Do culture intervention workshops if the implementation is not well perceived

Objectives

- Do not Let Up
- Make It Stick



Approach

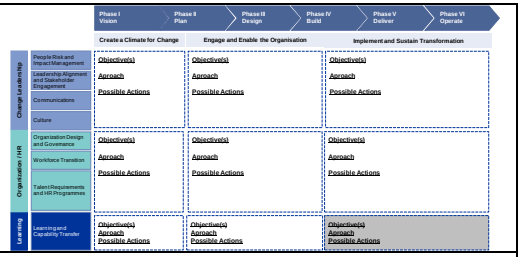
- Organisational and workforce transition activities
- Monitor effectiveness of the implementation
- Document lessons learned

Possible actions (non-exhaustive)

- Develop integrated talent management programs
- Perform lessons learned workshops
- Distribute lessons learned via various channels
- Re integrate lessons learned in (possible) new implementations

Objectives

- Do not Let Up
- Make It Stick



Approach

- Deliver training and new job skills if needed
- Update the online reference materials
- Evaluate the training programme in due course
- Deliver post go-live support
- Gather intellectual capital for future initiatives

Possible actions (non-exhaustive)

- Develop online reference documents and FAQ
- Perform training evaluations
- Install a post go live support desk
- Lessons learned sessions for the staff
- Install a knowledge management system

TEMPLATE

Project Acronym: **EPIC**

Grant Agreement number: **270895**

Project Title: **European Platform for Intelligent Cities**

EPIC Roadmap for Smart Cities

Template 4: Plan Phase – EPIC Project Charter

Version: 0.1

Authors:

Project co-funded by the European Commission within the ICT Policy Support Programme		
Dissemination Level		
P	Public	
C	Confidential, only for members of the consortium and the Commission Services	

1. Introduction

An EPIC project is a project undertaken by a city or city administration to take up the EPIC platform to develop, transform and evolve smart city services in order to become a smart city. For an EPIC project, the EPIC roadmap describes the planned series of actions, tasks and steps to achieve the objectives that are documented in an EPIC Smart City business case.

The project management framework for the roadmap provides a method for cities or city administrations to manage an EPIC project. The project management framework provides the structures, a set of templates, a common vocabulary and a list of recommended standards to be used in the management of an EPIC project.

This project charter document is an important deliverable of the vision phase when implementing the project management framework of an EPIC project.

1.1 Purpose of This Document

Based on the business case of the new EPIC project, the project charter will authorize the new EPIC project and its project manager. Next to the business case, which contains a financial motivation for the project, the project charter provides a high-level overview of the why, the how, the what, the when and the who of the project.

The project charter sets the foundation for the project as it will be leveraged as a reference document during all following phases. This implies that the project charter provides a solid overview of the project, which can gain the motivation of all relevant stakeholders.

The purpose of this document is to describe the project charter for the implementation and testing of the EPIC pilots in the city of Tirgu-Mures (T-M). This document provides pragmatic suggestions for implementing the existing EPIC pilots in the city of T-M. The testing of the roadmap with the stakeholders of T-M is described in relation with the implementations of the EPIC pilots. The ability to share these new applications in a cost-effective and efficient manner that exploits synergies and stimulates further innovation will be demonstrated by T-M which will adapt selected applications to meet local citizen and SME needs.

EPIC partners have the ambition to build a commercial service out of the EPIC project. As such, a key deliverable for the project will be the creation of 'usage roadmap' for cities that (1) outlines scalable and replicable implementations of the EPIC platform and the accompanying smart city services and (2) contains a full business case for roll-out/exploitation of a full web-based service delivery model that identifies a variety of differing business models (e.g. open source, PPP, pay-per-use and licensing). These models and roadmap will be tested for sustainability in the T-M pilot.

The concrete plans for "proof-of-concept" testing for T-M are not defined clearly in the EPIC DoW. It is evident however from the second review meeting that the reviewers will require more than a paper-based deliverable. It appears they will expect to see versions of the current Pilots made relevant to the citizens of T-M and running on the EPIC platform.

1.2 Overview of this Document

This document provides a high-level overview of the why, the how, the what, the when and the who of the project:

- Why: Project background
- How: Project methodology
- What: Project definition
- When: Project plan
- Who: Project management

Each of these aspects is described in a dedicated chapter of this document.

2. Project Background

This section provides an insight in why this project is an essential step in becoming a smart city. The project context, objectives, expectations and an overview of the impacted stakeholders will already describe the general background for the project. Next, a name and identification of the project is defined in order to be able to address the project in a unique way.

2.1 Context

<< What are the main elements from the EPIC business case that triggered or initiated this project? What are the current needs that this EPIC project will fulfill? >>

<< What is the background of these desires, are these requirements isolated or can they be placed in a broader scope of general trends and evolutions? >>

2.2 Objectives and Expectations

<< How will this EPIC project fulfill the needs mentioned in the previous paragraph? What are the concrete results to be expected? >>

2.3 Stakeholders

<< Who will be impacted by this EPIC project? Specify the table below by refining the stakeholder list and by describing the impact of the project on each stakeholder. >>

EPIC Project Stakeholder	*Stakeholder description and impact*
City Administration Representative	*Which city administration coordinates the city services and is the main requester for smart city services provided through the EPIC platform?* *Which city administration representative represents the city administration for the implementation of smart city services and is the main contact person for this EPIC project?*
Interest Groups	*Which interest groups (communities or organisations) that have an interest in smart city services and can influence the implementation of EPIC services, are relevant for this project?* *(e.g. national or supra-national governments, industry consortia, businesses or SMEs)*
User Representative	*Which addressable users can be requested to perform project activities, for example testing? An addressable user representative represents the group of end-users that are*

	closely involved and addressable within an EPIC project. *(e.g. employees working for the city administration)* *A non-addressable user is a generically identifiable person which can't be requested to perform project activities. This user representative represents the group of end-users that is not closely involved or addressable within an EPIC project. How are non-addressable users impacted?* *(e.g. citizens living in Europe)*
Product Provider	*The product provider delivers the underlying product(s) for the specific EPIC service.*
Solution Provider	*The solution provider develops and delivers the solution for the specific EPIC service using the product(s) of the product provider.*
Infrastructure Provider	*The infrastructure provider delivers and operates the infrastructure for running the solution of the EPIC service.*
Service Provider	*Within the context of an EPIC project, the service provider operates and offers the developed solution of the solution provider to the end-users.*
Content Provider	*The content provider connects and delivers relevant content to the developed solution of the solution provider.*
External Service Provider	*The external service provider delivers supporting services to the implemented solution of the solution provider, in the operation of an EPIC service.*
EPIC Governance Organisation	*The EPIC governance organisation coordinates and manages the delivery of the services and platform, and controls the EPIC service catalogue.*
EPIC Support Organisation	*The EPIC support organisation delivers relevant support and guidance in the selection, development and operation of the EPIC services, in using the EPIC roadmap and the EPIC service catalogue.*

2.4 Project Identification

<< What are the name and possible unique identifier for addressing this specific EPIC project? >>

3. Project Methodology

In this section, the different phases of the EPIC roadmap are described in more detail based on selected methodologies. For each phase, the objective is described outlining the aspects to be achieved. Next, the tasks and work products are provided and described for each discipline. The tasks within each discipline are performed by a specific role in the EPIC service implementation project. The process gateway defines the elements that need to be provided or approved in order to successfully progress to a next phase.

3.1 Overall Project Methodology

A project is typically defined as a temporary undertaking including a carefully planned set of activities to achieve a particular aim as documented in a specific business case. A roadmap is an action plan describing a planned series of actions, tasks or steps designed to achieve an objective or goal.

An EPIC project is a project undertaken by a city or city administration to take up the EPIC platform to develop, transform and evolve smart services in order to become a smart city. For an EPIC project, the EPIC roadmap describes the planned series of actions, tasks and steps to achieve the objectives that are documented in an EPIC Smart City business case.

The project management framework for the roadmap provides a method for cities or city administrations to manage an EPIC project. The project management framework provides the structures, a set of templates, a common vocabulary and a list of recommended standards to be used in the management of an EPIC project.

An overview of the phases and disciplines for the roadmap are provided in Figure 16. The phases of the EPIC roadmap represent the progression of key groups of activities in the project life cycle. The disciplines of the roadmap reflect themes of expertise that span these project phases. Within the roadmap, each discipline consists of tasks that are performed by specific roles and that produce work products, using specific development aids (e.g. templates). For the base EPIC roadmap, a sequential execution of the project phases is prescribed.

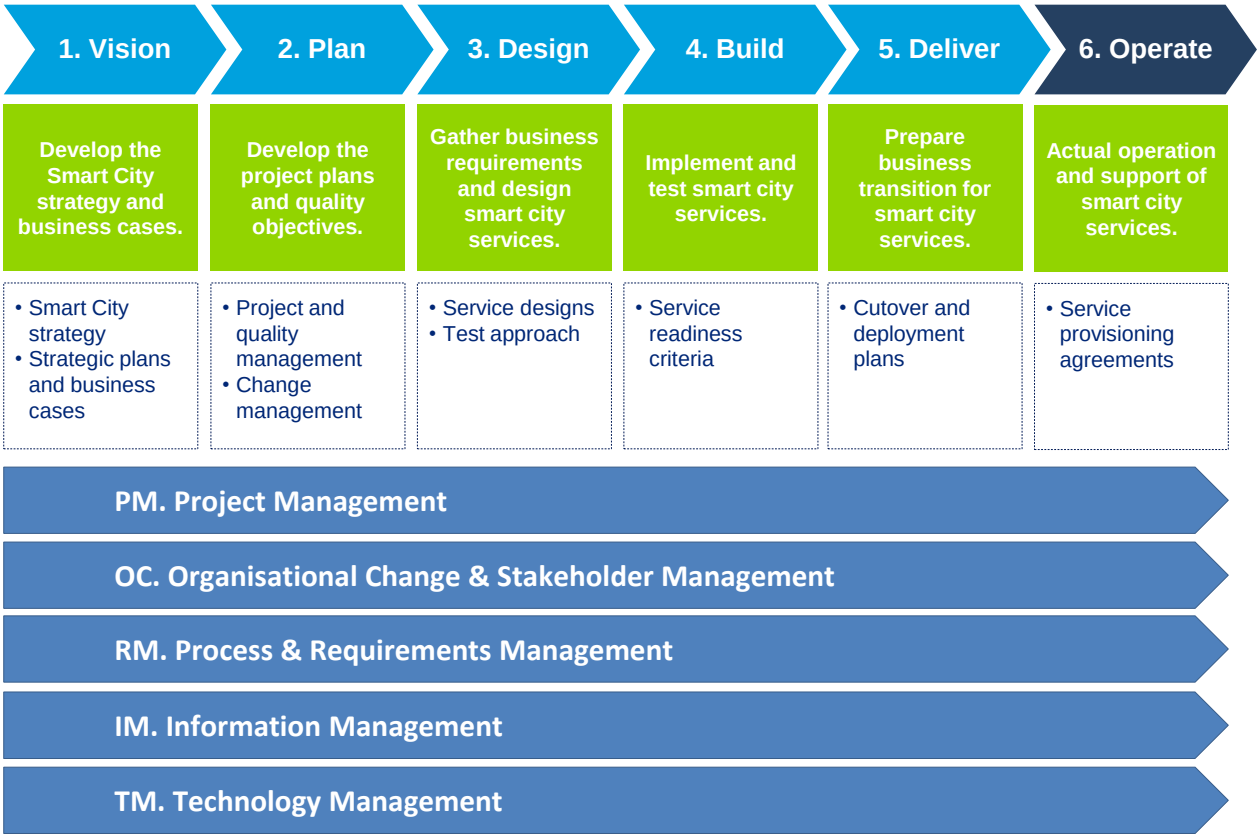


Figure 16 - Overview of Phases, Disciplines and Results for EPIC Project

The detailed descriptions of the phases and disciplines are provided in Annex.

3.2 Access and On the Ground Support Requirements

Clearly the EPIC pilots for T-M cannot be implemented without the involvement of the T-M city administration, local user groups and data providers. It is envisaged that this will require the following:

a) A visit to T-M by the pilot technical leads and the user-testing leads to meet with the city administrations
b) Identification of local providers for Points of Interest and property data for the implementation of the Relocation service
c) Identification of region of city to be included in the Urban Planning service and securing of data for the 3D-model building
d) Identification of possible households for domestic energy pilot, subject to broadband availability and access to electricity meter to allow installation of clamp meter

e) Identification of possible public buildings that could provide data-feeds for public building energy monitoring
f) Identification of local stake-holder groups with who User Test lead could work to recruit users for closed-group and open-group testing
g) Identification of any local software developers who could be involved in the creation of T-M web-services to expose local data feeds to the EPIC platform web-services
h) Identification of any local software developers who could be involved in the creation of T-M themed portlets
i) Identification of local experts who could assist with translation requirement for Romanian language portlets

It is important to highlight that the T-M digital strategy extends past the EPIC project end-date. The Deloitte roadmap testing with T-M will make both an important contribution to the digital strategy and provide validation of the roadmap toolkit. However, it cannot directly inform the subsequent implementation of the EPIC pilots as there is insufficient time to do this. It is however hoped that some parts of the roadmap toolkit can be used to measure the value of the pilots, even when these may not fully align to the key priorities of the longer-term T-M digital strategy.

3.3 User Testing Requirements

In phase 3-Design, the overall testing approach for the different pilots should already be defined. These testing activities will then be executed in phase 4-Build and finalised in phase 5-Deliver, before taking the EPIC pilots into a real-life production environment.

Coordination of the user-testing with T-M will be undertaken by IBBT who are also coordinating the current user testing with IBBT, Navidis and Manchester pilot users. The user testing team in T-M will execute each step within the user testing process. The three pilots will give assistance, examples of good practices, templates and feedback to T-M in setting up the execution of each of these steps:

- Setting up proof-of-concept innovation ecosystem
- Test user recruitment for closed and open phase in T-M, with maximising use of ENoLL membership
- User management: A panel manager in TM will be doing the registration of recruited users into EPIC (creating user accounts and id's) as well as assigning them access rights to the pilots
- Collection and analysis of user-test data
- Ensuring user training and user support

4. Project Definition

This section provides an insight in what this project will deliver. Starting from the project scope, the overall approach, assumptions and constraints, critical success factors and project interdependencies are identified.

4.1 Project Scope

<< What will this project deliver in terms of smart city services? Refer to the high-level functional and technical capabilities of the EPIC services that will be the result of this project. >>

<< What is out of scope for this project and will not be covered by the envisioned EPIC service? >>

4.2 Project Approach

The overall project approach is based on the generic EPIC roadmap.

<< If needed, the EPIC roadmap can be fine-tuned and detailed in this section according to the project context >>

4.3 Assumptions and constraints

Assumptions:

- *<< Precondition assumed as true at the start of the EPIC project >>*
- *<< Precondition assumed as true at the start of the EPIC project >>*
- *<< Precondition assumed as true at the start of the EPIC project >>*

Constraints:

- *<< Limitation in the context of the EPIC project >>*
- *<< Limitation in the context of the EPIC project >>*
- *<< Limitation in the context of the EPIC project >>*

4.4 Critical Success Factors

The table below provides an overview of the conditions that must be true during (and after if relevant) the project in order to guarantee the success of the EPIC project:

Critical success factor	*Description of the impact*
<< Condition>>	*<< Impact description >>*

4.5 Project Interdependencies

The table below provides an overview of related projects with direct or indirect impact on the results of this EPIC project:

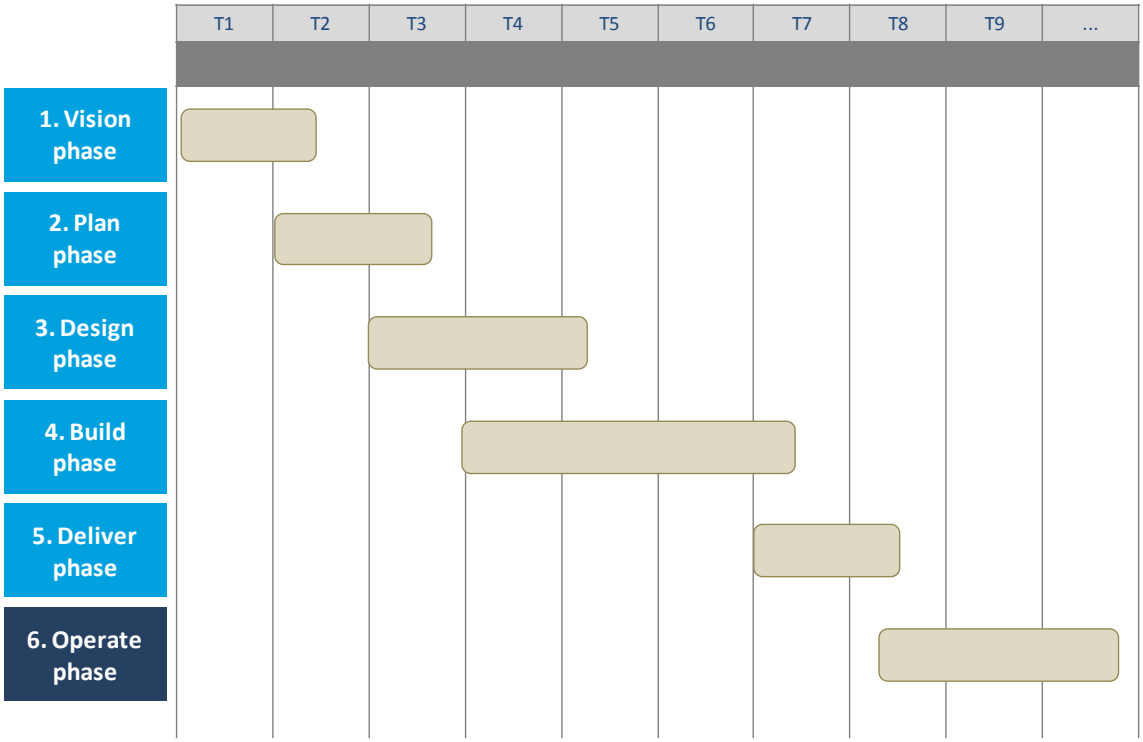
Project name	*Description of the dependency*
<< Project name >>	*<< Dependency description >>*

5. Project Plan

This section provides an insight in when the project will deliver the expected results.

5.1 Milestone Plan

<< Propose and describe the concrete and realistic planning, the activities and milestones for the project. An example of a planning based on the EPIC project phases is provided in the following figure. >>



<< Define the concrete results to be achieved for each milestone. >>

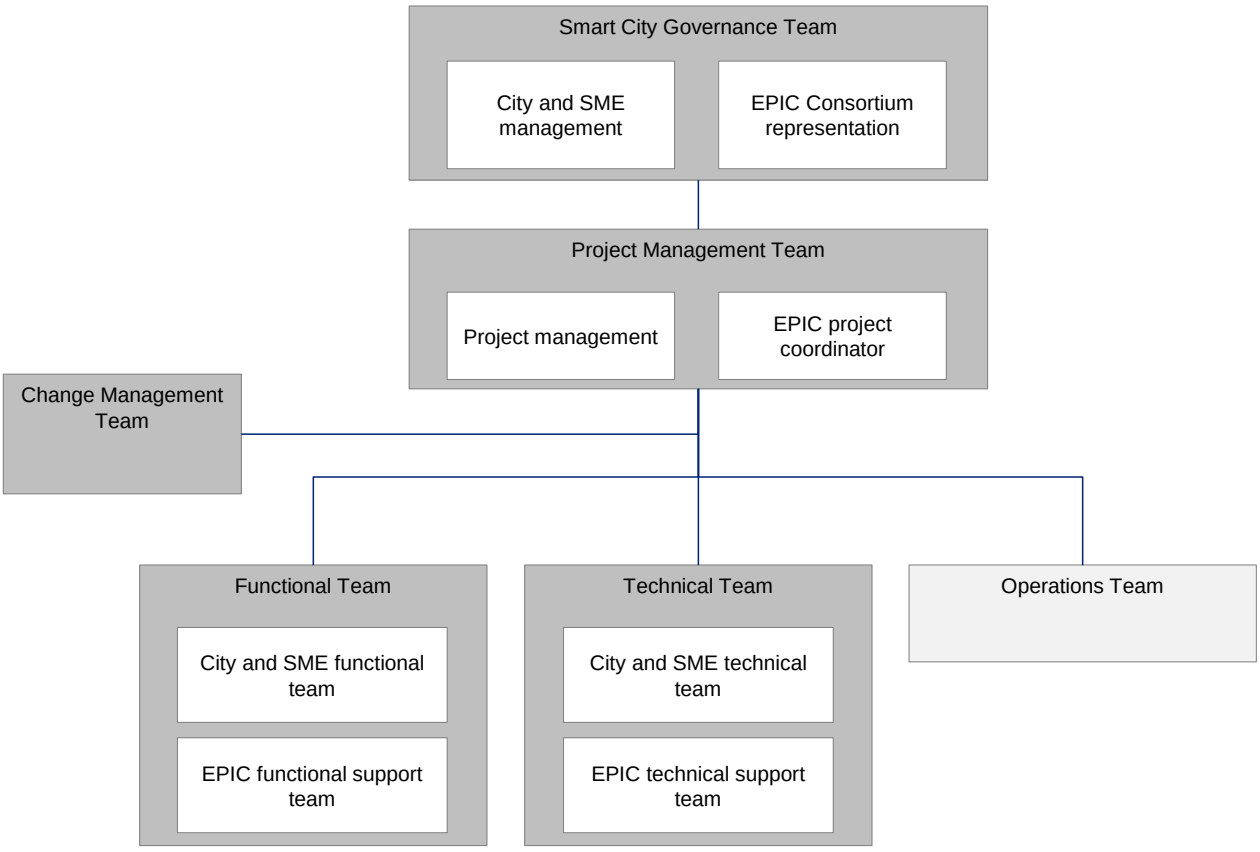
5.2 Resource Plan

<< List and describe the resources and skills needed for performing the different activities of the milestone plan. >>

6. Project Management

6.1 Project Organisation

Next to the stakeholders, a project organisational structure, including project roles and responsibilities, is defined for the execution of an EPIC service implementation project. The project roles involved in the execution of the roadmap are identified based on the proposed phases, disciplines and detailed actions in the generic roadmap. A generic project organisational structure is provided in the figure below, including the identified roles involved in the execution of the different tasks per discipline.



6.2 Roles and Responsibilities

In the following table, the identified roles for the EPIC roadmap are described in more detail. Furthermore, the possible involved EPIC stakeholders are identified for each specific role. It is assumed that the service provider takes a leading role in the EPIC service implementation project, together with the city administration representative.

<< Assign the stakeholders to the EPIC project roles by completing the table below. >>

EPIC Roles	Description	Involved EPIC Stakeholder
Smart City Governance Team	*The project governance team evaluates and takes decisions on the initiation, control and delivery of the project according to the defined strategy and goals, as documented in a business case.*	*City Administration Representative,* *EPIC Governance Organisation,* *Service Provider*
Project Management Team	*The project management team is responsible for the day-to-day execution and delivery of the project, especially of the delivery of the required products within the defined scope.*	*City Administration Representative,* *Service Provider*
Change Management Team	*The change management team ensures the communication and adoption aspects within the project for the operation of the EPIC service.*	*City Administration Representative,* *Advisory Service Provider,* *Service Provider,* *Interest Groups*
Functional Team	*The functional team is responsible for the definition and control of the functional requirements for the EPIC service.*	*Service Provider,* *Solution Provider,* *Content Provider,* *External Service Provider,* *Addressable User,* *Non-Addressable User*
Technical Team	*The technical team is responsible for the development and control of the technical components for the EPIC service.*	*Service Provider,* *Solution Provider,* *Product Provider,* *Infrastructure Provider,* *Content Provider,*

		External Service Provider
Operations Team	*The operational team is responsible for the support and operations of the EPIC service, in an operational mode.*	*Service Provider,* *Infrastructure Provider,* *Content Provider,* *External Service Provider*

6.3 Project Procedures

<< Describe the high-level steps and activities for the most important management tasks for the project, including for example scope and change management and risk management. >>

6.3.1 Project Scope and Change Management

<< Detail the high-level steps and activities related to the follow-up of scope elements and related changes. >>

6.3.2 Risk Management

<< Detail the high-level steps for the identification, definition and mitigation of risks related to the EPIC project. >>

TEMPLATE

Project Acronym: **EPIC**

Grant Agreement number: **270895**

Project Title: **European Platform for Intelligent Cities**

EPIC Roadmap for Smart Cities

Template 5: Plan Phase – Project Management and Quality Plan

Version: 0.1

Authors:

Project co-funded by the European Commission within the ICT Policy Support Programme		
Dissemination Level		
P	Public	
C	Confidential, only for members of the consortium and the Commission Services	

1. Introduction

An EPIC project is a project undertaken by a city or city administration to take up the EPIC platform to develop, transform and evolve smart city services in order to become a smart city. For an EPIC project, the EPIC roadmap describes the planned series of actions, tasks and steps to achieve the objectives that are documented in an EPIC Smart City business case.

The project management framework for the roadmap provides a method for cities or city administrations to manage an EPIC project. The project management framework provides the structures, a set of templates, a common vocabulary and a list of recommended standards to be used in the management of an EPIC project.

This project management plan document is an important deliverable of the plan phase when implementing the project management framework of an EPIC project.

1.1 Purpose of this Document

Based on the business case and the project charter of the new EPIC project, the project management plan supports the concrete and practical execution of the project. Next to the project charter, the project management plan documents the structure, processes, and resources that will be used to execute the EPIC project and deliver the agreed smart city services. The project management plan covers the project organisation, approach and timeline, work planning and controls, resource management, tools, and communication plans.

The project management plan needs to be approved by the project sponsor and leadership during project planning, and is maintained throughout the life of the project via the project's change control process. It is a living document that is kept up-to-date, and should be considered the primary source for information about the project organisation, stakeholders, processes, tools, and terminology.

1.2 Content of this Document

This document provides a detailed description of the project approach and organisation, including the following elements:

- Project methodology
- Project scope, approach, assumptions and constraints, success factors and interdependencies
- Project milestone, resource and tool plan
- Project management, organisation, roles and responsibilities, and procedures

These aspects are described in a dedicated chapter of this document.

2. Project Background

This section provides an insight in why this project is an essential step in becoming a smart city. The project context, objectives, expectations and an overview of the impacted stakeholders will already describe the general background for the project. Next, a name and identification of the project is defined in order to be able to address the project in a unique way.

2.1 Context

<< What are the main elements from the EPIC business case that triggered or initiated this project? What are the current needs that this EPIC project will fulfill? >>

<< What is the background of these desires, are these requirements isolated or can they be placed in a broader scope of general trends and evolutions? >>

2.2 Objectives and Expectations

<< How will this EPIC project fulfill the needs mentioned in the previous paragraph? What are the concrete results to be expected? >>

2.3 Stakeholders

<< Who will be impacted by this EPIC project? Specify the table below by refining the stakeholder list and by describing the impact of the project on each stakeholder. >>

2.4 Project Identification

<< What are the name and possible unique identifier for addressing this specific EPIC project? >>

3. Project Methodology

In this section, the different phases of the EPIC roadmap are described in more detail based on selected methodologies. For each phase, the objective is described outlining the aspects to be achieved. Next, the tasks and work products are provided and described for each discipline. The tasks within each discipline are performed by a specific role in the EPIC service implementation project. The process gateway defines the elements that need to be provided or approved in order to successfully progress to a next phase.

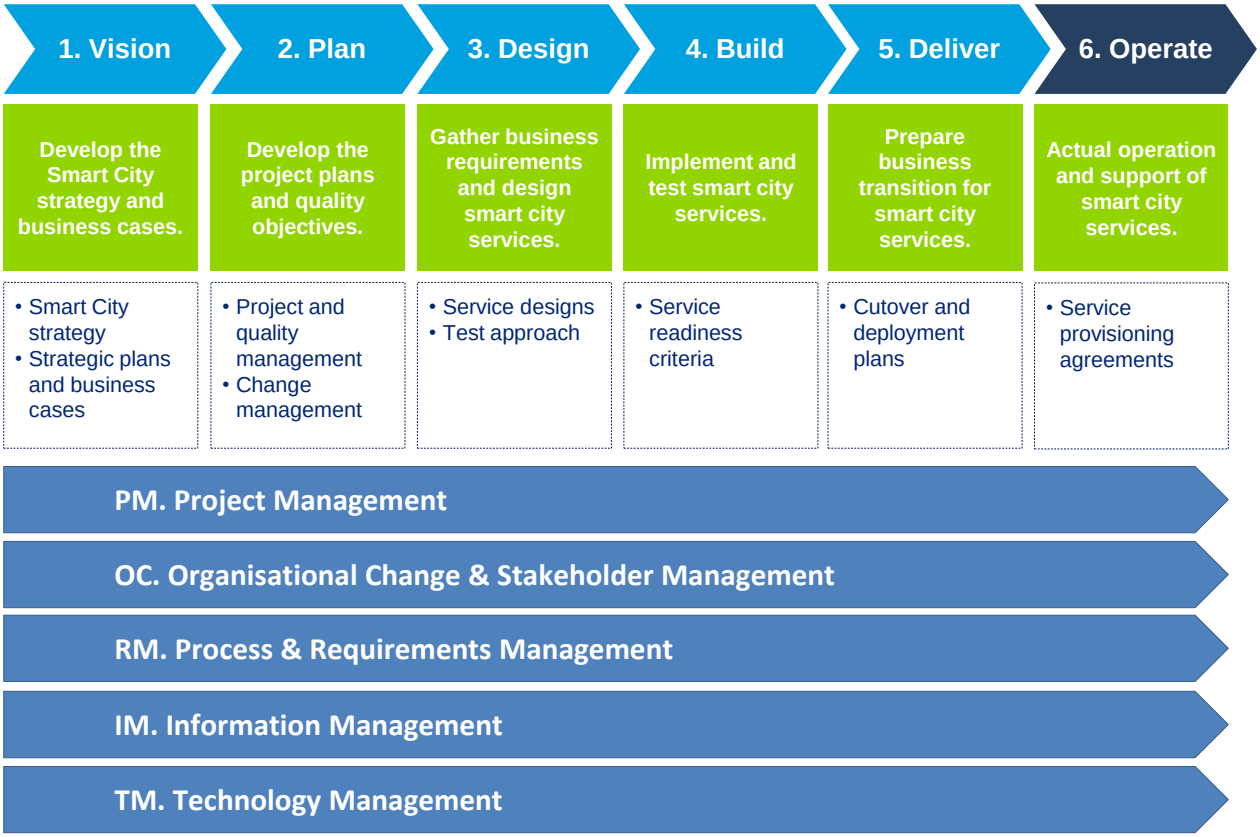


Figure 17 - Overview of Phases and Disciplines for EPIC Project Methodology

4. Project Definition

This section provides an insight in what this project will deliver. Starting from the project scope, the overall approach, assumptions and constraints, critical success factors and project interdependencies are identified.

4.1 Detailed Project Scope

<< What will this project deliver in terms of smart city services? Refer to the high-level functional and technical capabilities of the EPIC services that will be the result of this project. >>

<< What is out of scope for this project and will not be covered by the envisioned EPIC service? >>

4.1.1 Process Scope
4.1.2 Functional Scope
4.1.3 Technical Scope
4.1.4 Deliverable Scope
4.1.5 Release and Deployment Scope
4.1.6 Other Scope

4.2 Detailed Project Approach

The overall project approach is based on the generic EPIC roadmap.

<< If needed, the EPIC roadmap can be fine-tuned and detailed in this section according to the project context >>

4.3 Assumptions and Constraints

Assumptions:

- *<< Precondition assumed as true at the start of the EPIC project >>*
- *<< Precondition assumed as true at the start of the EPIC project >>*
- *<< Precondition assumed as true at the start of the EPIC project >>*

Constraints:

- *<< Limitation in the context of the EPIC project >>*
- *<< Limitation in the context of the EPIC project >>*
- *<< Limitation in the context of the EPIC project >>*

4.4 Critical Success Factors

The table below provides an overview of the conditions that must be true during (and after if relevant) the project in order to guarantee the success of the EPIC project:

Critical success factor	*Description of the impact*
<< Condition>>	*<< Impact description >>*

4.5 Project Interdependencies

The table below provides an overview of related projects with direct or indirect impact on the results of this EPIC project:

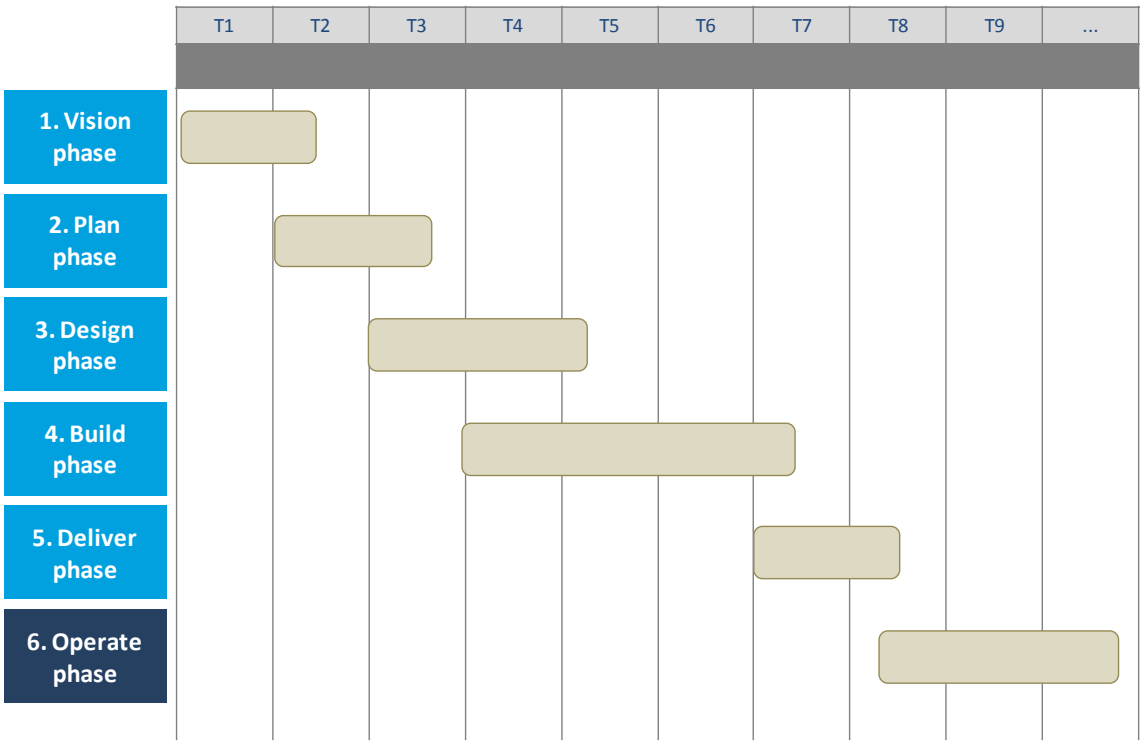
Project name	*Description of the dependency*
<< Project name >>	*<< Dependency description >>*

5. Project Plan

This section provides an insight in when the project will deliver the expected results.

5.1 Milestone Plan

<< Propose and describe the concrete and realistic planning, the activities and milestones for the project. An example of a planning based on the EPIC project phases is provided in the following figure. >>



<< Define the concrete results to be achieved for each milestone. >>

5.2 Resource Plan

<< List and describe the resources and skills needed for performing the different activities of the milestone plan. >>

5.2.1 Labour Resources

<< Describe the project resources needed by type (skills/competencies), levels, and dates, based upon the scope and activities defined. >>

<< Describe the skills and competencies in the following table which the project team will need to acquire in order to effectively fulfill their project assignments. >>

Skill Needed	*Target Role*	*Target Date*

5.2.2 Non-Labour Resources

<< Provide in the following table the non-labour resources that enables a proactive approach to identifying, tracking, and acquiring material resources (for example equipment, software, materials, and so on) needed by the project. >>

Material Description	*Responsibility of*	*Date Needed*

5.3 Project Tools Plan

5.3.1 Project Tool Summary

<< Provide in following table all the tools that will be used to support the successful planning, execution, monitor and control, and delivery of the project. >>

Tool Description	*Responsibility of*	*Date Needed*

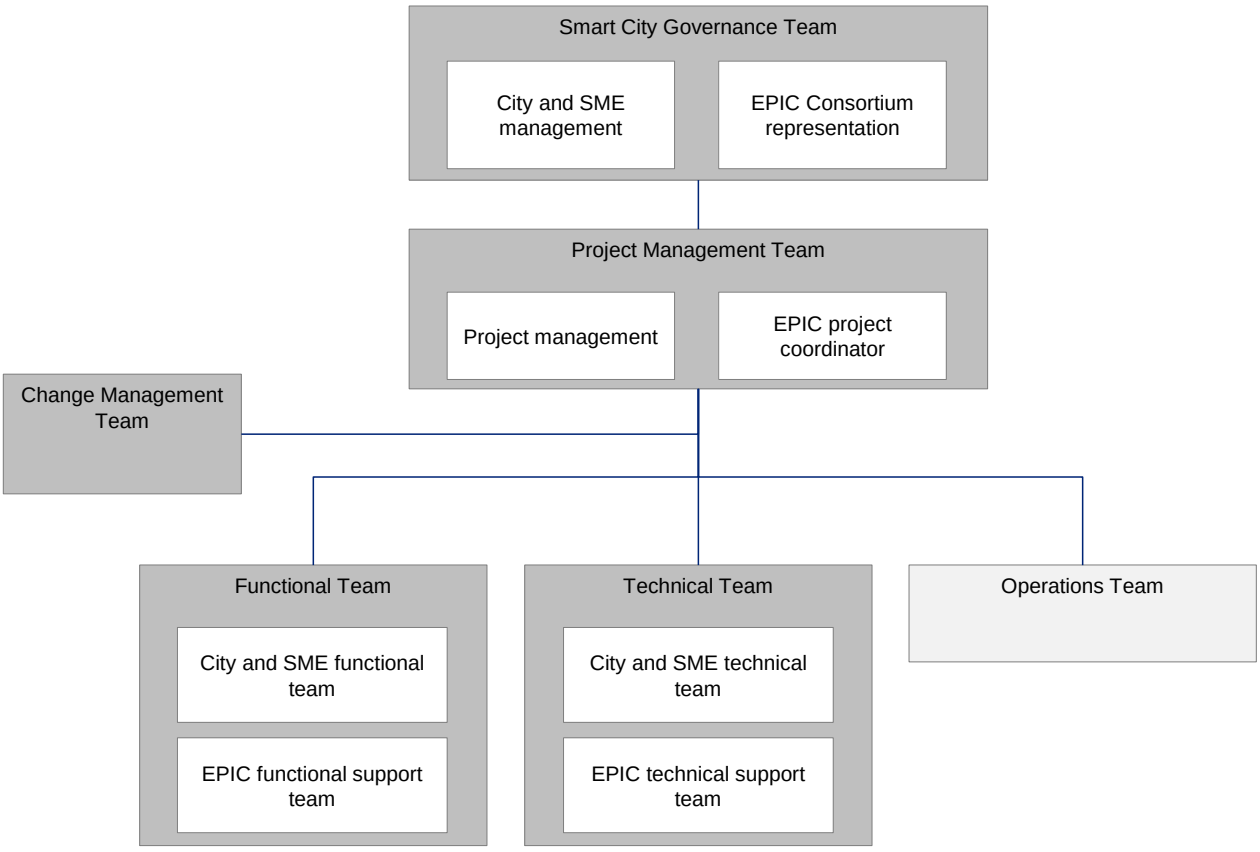
5.3.2 Project Tool Details

<< Document the key planning and logistics details for each project tool listed in the project tool summary table above. >>

6. Project Management

6.1 Project Organisation

Next to the stakeholders, a project organisational structure, including project roles and responsibilities, is defined for the execution of an EPIC service implementation project. The project roles involved in the execution of the roadmap are identified based on the proposed phases, disciplines and detailed actions in the generic roadmap. A generic project organisational structure is provided in the figure below, including the identified roles involved in the execution of the different tasks per discipline.



<< This section describes the project's organisation, including the steering committee, the project management and the project team organisation. >>

6.1.1 Project Governance Team

<< Define the project's steering committee members in the following table, and designate which member will serve as chairperson. >>

Project Governance Member	*Contact Info*
John Doe (Chair)	

6.1.2 Project Management Team

<< Define the members of the project management team in the following table, and designate the project manager role. >>

Project Management Team Member	*Contact Info*

6.1.3 Project Team Organisation

<< Define the members of the change management team, the functional team, the technical team and the operations team in the following tables, and indicate their team role(s). >>

Change Management Team Member	*Contact Info*	*Team Role(s)*

Functional Team Member	*Contact Info*	*Team Role(s)*

Technical Team Member	*Contact Info*	*Team Role(s)*

Operational Team Member	*Contact Info*	*Team Role(s)*

6.2 Roles and Responsibilities

In the following table, the identified roles for the EPIC roadmap are described in more detail. Furthermore, the possible involved EPIC stakeholders are identified for each specific role. It is assumed that the service provider takes a leading role in the EPIC service implementation project, together with the city administration representative.

<< Assign the stakeholders to the EPIC project roles by completing the table below. >>

EPIC Roles	*Description*	*Involved EPIC Stakeholder*
Project Governance Team	*The project governance team evaluates and takes decisions on the initiation, control and delivery of the project according to the defined strategy and goals, as documented in a business case.*	*City Administration Representative,* *EPIC Governance Organisation,* *Service Provider*
Project Management Team	*The project management team is responsible for the day-to-day execution and delivery of the project, especially of the delivery of the required products within the defined scope.*	*City Administration Representative,* *Service Provider*
Change Management	*The change management team*	*City Administration*

Team	*ensures the communication and adoption aspects within the project for the operation of the EPIC service.*	*Representative,* *Advisory Service Provider,* *Service Provider,* *Interest Groups*
Functional Team	*The functional team is responsible for the definition and control of the functional requirements for the EPIC service.*	*Service Provider,* *Solution Provider,* *Content Provider,* *External Service Provider,* *Addressable User,* *Non-Addressable User*
Technical Team	*The technical team is responsible for the development and control of the technical components for the EPIC service.*	*Service Provider,* *Solution Provider,* *Product Provider,* *Infrastructure Provider,* *Content Provider,* *External Service Provider*
Operations Team	*The operational team is responsible for the support and operations of the EPIC service, in an operational mode.*	*Service Provider,* *Infrastructure Provider,* *Content Provider,* *External Service Provider*

6.3 Project Procedures

<< Describe the detailed steps and activities for a selection of project related management tasks, including scope and change management and risk management. Possible other project procedures could be added in this section. >>

6.3.1 Project Decisions

<< Document the process, templates and tools that the project will use to identify, analyse and evaluate large project decisions, which have potential impact on project scope, schedule or quality. >>

6.3.2 Project Monitor and Control Plan

<< Document the process, templates and tools that the project will use to monitor, >>

6.3.3 Project Scope and Change Management

<< Detail the concrete and practical steps and activities related to the follow-up of scope elements and related changes. >>

6.3.4 Issue Management

<< Document the process, templates, and tools that the project will use to identify, evaluate, and manage issues throughout the life of the project. >>

6.3.5 Action Items

<< Document the process and tools that the project will use to log action items and manage them to closure throughout the life of the project. >>

6.3.6 Risk Mitigation

<< Detail the concrete and practical steps for the identification, definition and mitigation of risks related to the EPIC project. >>

6.3.7 Deliverable Acceptance

<< Document the process, roles and responsibilities, templates and tools that the project will use to approve and accept the deliverables and results of the project. >>

6.3.8 Stakeholder Communication Plan

<< Document the process, templates and tools that the project will use to define and perform the appropriate communications to the relevant stakeholders. >>

7. Quality Management

The purpose of the quality management plan is to define the objectives, processes, tools, metrics, and roles and responsibilities required to implement an effective quality management program for the implementation of EPIC services.

The quality management plan needs to be approved by the project sponsor and governance team during project planning, and is maintained throughout the life of the project via the project's change control process.

7.1 Quality Management Framework

<< Describe the approach and structure for the activities and tasks to effectively plan, execute and monitor and control the project quality. >>

<< Describe the quality planning and the assurance, control and support activities for the project to implement the EPIC service. >>

7.2 Quality Assurance Plan

<< Quality assurance is the application of planned, structured activities to help verify that the project employs all processes needed to create high-quality deliverables that meet the requirements. Describe the tasks related to quality assurance in the quality management framework, and define the assessment review plans for the project. >>

7.2.1 Overview

<< Provide a short overview of the activities, principles, standards and roles/responsibilities involved in performing the quality assurance activities. >>

7.2.2 Quality Assurance Activities

<< Describe the tailoring activities for adapting the tasks, templates, tools or processes to meet the specific project requirements. Describe the activities for developing the project team and provide schedule of trainings for the effective use of project methods, templates and tools. Describe the establishment of baseline records for project deliverables at key milestones (for example at end of requirements phase). >>

7.2.3 Quality Standards

<< Define the general principles and standards for the quality of the deliverables and results of the implementation of EPIC services. These quality standards should be related to the specific quality policies of the city and other related stakeholders. >>

7.2.4 Quality Techniques

<< Describe the techniques and tools to be used and support the quality assurance activities, for example performing quality assessments and using specific checklists. >>

7.2.5 Quality Schedule

<< Describe the schedule for performing the quality assurance activities, possible including milestone based, deliverable based, scheduled or spot type of assessment schedules. >>

7.2.6 Quality Metrics

<< Define and describe the specific measures in relation to the quality objectives as defined in the quality management plan (and stakeholders' quality policies). Use the SMART objectives for selecting the quality metrics. >>

7.2.7 Roles and Responsibilities

<< Describe the key roles and responsibilities involved in executing the project's quality management plan and assurance activities. Identify the possible role of a quality manager within the different teams, in order to ensure the independence from the project manager. >>

Role	*Responsibilities*
Project Management Team	- *Develop and maintain the Quality Management Plan*
Project Governance Team	- *Review and approve the Quality Management Plan*
Functional, Technical and Operations Team	- *Participate in assessments and project review activities*
Change Management Team	- *Ensure the coaching and support for quality methods and tools*

7.2.8 Tracking, Logging and Reporting

<< Describe the process and tools for tracking and logging the results from the quality assessments and assurance activities. Define the collection, analysis and reporting of the results for the identified quality metrics. Describe the method (e.g. templates) and planning for reporting the quality assessment results and status to the project management and governance team. >>

Annex I: Project Glossary

<< List the main terms used in the project and the project management plan and provide a clear description. >>

Term	*Description*

TEMPLATE

Project Acronym: **EPIC**

Grant Agreement number: **270895**

Project Title: **European Platform for Intelligent Cities**

EPIC Roadmap for Smart Cities

Template 6: Design Phase – EPIC Service Reference Design

Version: 0.1

Authors:

Project co-funded by the European Commission within the ICT Policy Support Programme		
Dissemination Level		
P	Public	
C	Confidential, only for members of the consortium and the Commission Services	

1. Introduction

An EPIC project is a project undertaken by a city or city administration to take up the EPIC platform to develop, transform and evolve smart city services in order to become a smart city. For an EPIC project, the EPIC roadmap describes the planned series of actions, tasks and steps to achieve the objectives that are documented in an EPIC Smart City business case.

The project management framework for the roadmap provides a method for cities or city administrations to manage an EPIC project. The project management framework provides the structures, a set of templates, a common vocabulary and a list of recommended standards to be used in the management of an EPIC project.

One of the phases in the project management framework is the design phase. The objective of the design phase is to document business requirements, business processes, software configuration, software gaps, change impacts, application security, and technical infrastructure and to create a detailed design for the EPIC service. Also the prototyping of a proof of concept can be part of the design phase.

1.1 Purpose of this Document

The Service Reference Design document is an important deliverable of the design phase when implementing the project management framework of an EPIC project. The document describes the requirements and the various design aspect of the EPIC implementation in order to ensure that the EPIC services meet the city requirements. The elements described in this document provide an important input to the actual design and implementation of the smart city services.

1.2 Content of this Document

First, this document will provide a description of the smart city services that will be implemented in the context of the EPIC project, including a comprehensive list of the service requirements. These service requirements are analysed and defined in more detail via an analysis of the business processes and the corresponding use cases and events.

In the subsequent sections the design of the services is documented. After a high-level overview of the service design, each component of the design is described in more detail in the dedicated sub-sections. The following design components / sub-sections are included:

- **Data**: describes the data architecture and data model for the smart city services.
- **Functional details**: in most cases the implementation of the EPIC project will be based on exiting services. The possible gaps between the existing services and the service requirements need to be identified and resolved.
- **Technology**: describes the platforms, protocols and standards used to implement the smart city services.
- **Infrastructure**: documents the specifications related to hardware, network and storage of the smart city service design.

- **Security**: defines the security risks and requirements and corresponding mitigation actions. Special topics are data protection, privacy and identity and access management.

2. Service Description

In this section the smart city services that will be implemented through the EPIC project are described in more detail. First, the list of services required by the smart city needs to be defined. Based on the overview of the smart city services, more detailed service requirements are identified. A business process analysis will define the underlying workflow of the smart city services in order to get a better understanding of the differences between the to-be processes and the current situation. The smart city services can be further defined and detailed through the definition of use cases and events.

2.1 Smart City Services

<< Provide an overview of the smart city services that need to be implemented in order to achieve the goals and objectives of the EPIC project. Indicate what types of services are in scope of the project and what types of services are out of scope. >>

2.2 Service Requirements

<< Provide a comprehensive list of the service requirements, which are the needs that must be addressed by the smart city services. The service requirements must be specific enough to enable the definition of the service design in the next section. Score the service requirements based on their priority. >>

ID	*Name*	*Description*	*Priority*
<< Nr. >>	*<< Document the name of the requirement. >>*	*<< Describe the requirement in detail. >>*	*<< Define the priority of the requirement. >>* *High / Medium / Low*

2.3 Business Process Analysis

<< Define and document the business processes that will be affected by the smart city services, in compliance with the overall project scope and objectives. Provide high-level scope information on each process in scope to define what the process includes and what it doesn't include (sub-processes, activities and tasks). Process profiles are used to capture information about each process, such as the inputs to and the outputs from the process, the process owner, how frequently the process occurs, and the performance metrics used to measure the process. The workflow of the process can be described by means of a graphical representation. >>

Name	Description	Input	Output	Owner	Performance	Dependencies
<< Document the name process. >>	<< Describe the process in detail. Identify the sub-processes and tasks. >>	<< Define the input to the process. >>	<< Define the expected output. >>	<< Define the person responsible for the process. >>	<< Identify the criteria to measure the performance of the process. >>	<< Identify and describe any dependencies between the current process and other processes. >>

<< Identify the roles required to support the to-be processes and identify the activities associated with each role. >>

Role Title	Responsibilities	Process
<< Define the role. >>	<< Describe the role in detail and identify the corresponding responsibilities. >>	<< Map the role onto the process, sub process and process activities. >>

<< Identify how critical the different services / processes are to the well-functioning of the smart city. Determine the possible impacts of the discontinuation of the service / processes and define appropriate remediation actions. >>

<< Compare the current situation with the future processes supported by the smart city services in order to define the impact and benefits of the EPIC project. >>

2.4 Use Cases and Events (Scenarios)

<< Document the use cases and corresponding events triggering the execution of the smart city services and underlying business processes. >>

Use Case Name:	*<< Document the name of the use case / scenario. >>*
Triggering Event:	*<< Identify the event triggering the execution of the use case / scenario >>*
Description:	*<< Provide a brief description of the use case / scenario. >>*
Actors:	*<< Identify the actors / roles involved in the use case / scenario. >>*
Precondition:	*<< Identify the conditions that must be met before the start of the use case / scenario. >>*
Flow of Activities:	*<< Document the activities that need to be performed as part of the use case / scenario. >>*
Post Conditions:	*<< Define the outcome or exit criteria of the use case / scenario. >>*
Dependencies:	*<< Identify and describe any dependencies between the current use case / scenario and other use cases / scenarios. >>*

3. Service Design

In this section the different components that make up the smart city service are elaborated. Starting from a high-level overview of the service design, each component (data, functional details, technology, infrastructure and security) will be described in detail.

3.1 Overview

<< Provide a high-level overview of the service design, including the different components and how they relate to each other. Clearly document the boundaries of the implementation. Define how the service interfaces with other services and with existing information systems. >>

3.2 Data

Smart city services are to a large extent composed of data. In this sub-section the data architecture and underlying data model of the smart city service are described in order to ensure the value, consistency, accessibility and security of the smart city's data.

3.2.1 Data Sourcing

<< Identify the source systems for the various data elements, as well as the systems that will publish the data in the design. >>

3.2.2 Logical Data Flow

<< Create the system-level data flows between source systems and to-be target information data stores and master data repositories. Determine the use of each data store and how data will be manipulated at each stage of the data architecture. This includes the publishing mechanism, publishing frequency, publishing specifications and subscribe models. >>

3.2.3 Logical Data Model

<< Define the data elements and their corresponding attributes that need to be handled by the smart city services. Produce a diagram to illustrate the relationship between the data elements. >>

<< Define metadata structures for the data elements and attributes to ensure data quality. The metadata can include: naming conventions, language, data attribute description, calculation, data type, data length, if the data is mandatory or optional, source system, default values and ranges, owner, etc. >>

3.2.4 Data analysis and Reporting Requirements

<< Define the requirements for data analysis and reporting. >>

3.3 Functional Details

The implementation of the EPIC project will in most cases be based on exiting smart city services. However, there might be some in-scope service requirements that are not supported by the functionality of the existing service. These gaps need to be defined and solved. In case a gap needs to be solved by adding new functionality to a standard existing service, the functional requirements need to be defined. In addition, several decisions need to be made related to the configuration of the services such as parameterization and layout.

3.3.1 Software Gaps

<< Identify and document the differences between the service requirements and the standard functionalities supported by the existing service. >>

<< Determine a solution for the gaps defined during the gap-analysis process. Describe the rationale that explains why the solution was chosen out of other potential solutions. >>

Gap	*Description*	*Alternative Solutions*	*Preferred Solution*
<< Define the requirement that is not met by the standard service functionality. >>	*<< Provide a more detailed description of the gap. Explain why the functionality does not meet the requirement. >>*	*<< Document all options with a minimum of two alternative solutions for accommodating the requirement. >>*	*<< Indicate which resolution type will be used to accommodate this requirement. Provide a rationale why this solution was selected. >>*

<< 4 ways to solve gaps: >>

Business process change	*Modify the business process design to close the gap.*
Manuel work-around	*A manual workaround will be used to accommodate the requirement.*
Application extension development	*Add to the standard software functionality by modifying the software application.*
Legacy system	*Use an existing system to support the requirement.*
Third-party solution	*Use a third-party solution or bolt-on to provide the functionality not included in the software solution.*

3.3.2 Additional Functional Requirements

<< Document the additional functional specifications to be added to the existing service as a consequence of the gap-analysis. Functional requirements can be defined related to functions, workflow, user interfaces and forms, system-to-system interfaces, reports and dashboards, etc. The functional specifications can be scored based on their priority. >>

ID	*Name*	*Description*	*Priority*
<< Nr. >>	*<< Document the name of the requirement. >>*	*<< Describe the requirement in detail. >>*	*<< Define the priority of the requirement. >>* *High / Medium / Low*

3.3.3 Service Configuration

<< Document the configuration decisions for the implementation of the smart city services based on the defined business requirements. Configuration decisions can be related to different areas such as parameters and (default) values, workflow orchestration, layout and design of user interfaces and forms, configuration of system-to-system interfaces, layout and design of reports and dashboards, etc.>>

3.4 Technology

The technology component describes the technological platforms, protocols and standards used for the implementation of the smart city services. Technical requirements will be defined to evaluate the platforms, protocols and standards.

3.4.1 Platforms

<< Identify the technological platforms that will be used for the implementation of the smart city services. >>

3.4.2 Protocols

<< Identify the protocols that will be used for the implementation of the smart city services. >>

3.4.3 Standards

<< Identify the technological standards that will guide the implementation of the smart city services. >>

3.4.4 Technical Requirements

<< Document the technical requirements for the implementation of the smart city services. >>

Name	*Description*	*Priority*
Performance	*<< Describe the requirement in detail. Indicate the minimum requirement that should be met. >>*	*<< Define the priority of the requirement. >>* *High / Medium / Low*
Interoperability		
Maintenance Operations		
Reliability		
Availability		
Security		
Usability		
Regulatory		

<< Evaluate and score the platforms, protocols and standards used for the implementation of the smart city services based on the technical requirements. >>

3.5 Infrastructure

The infrastructure describes the physical components, such as hardware, networks and storage required to implement the smart city services. This section will provide a representation of the physical production environment for the smart city solution.

3.5.1 Hardware Infrastructure

<< Develop a representation of the physical hardware infrastructure required to implement the smart city services in the production environment. The physical hardware infrastructure can refer to servers, workstations, mobile devices, monitors and terminals, sensors, etc. >>

3.5.2 Network Infrastructure

<< Develop a representation of the physical network infrastructure required to implement the smart city services. >>

3.5.3 Storage Infrastructure

<< Develop a representation of the physical storage infrastructure required to implement the smart city services. >>

3.6 Security

Security is an important aspect that needs to be taken into account during the design of the smart city services. Security relates to the protection of data and privacy, and in particular to the implementation of appropriate Identity and Access Management. First, the possible security risks and vulnerabilities and corresponding security requirements need to be identified. Based on these risks and requirements the appropriate processes, policies, controls and tools to mitigate the security risks can to be defined. Also the physical aspects of security (access to building, loss of devices, etc.) need to be taken into account at each stage.

3.6.1 Data protection

<< Identify the risks and requirements related to data protection based on the business needs (policies, contracts, strategy, current gaps, etc.) and external regulations. Rationalise the requirements by categorising them according to their commonalities. >>

<< Document the recommendations related to data protection and define the appropriate processes, policies, controls and tools to ensure data protection. >>

3.6.2 Privacy

<< Identify the risks and requirements related to the protection of privacy based on the business needs (policies, contracts, strategy, current gaps, etc.) and external regulations. Rationalise the requirements by categorising them according to their commonalities. >>

<< Document the recommendations related to the protection of privacy and define the appropriate processes, policies, controls and tools to ensure data protection. >>

3.6.3 Identity and Access Management

<< Define the functional and technical requirements for the Identity and Access Management solution. >>

<< Describe the architecture of the Identity and Access Management solution, including:

- *Main functional components;*
- *Interaction of these components with each other and with external entities;*
- *Information that is managed, stored, and presented;*
- *Hardware and software components;*
- *Deployment environments. >>*

<< Define user roles and functions and determine appropriate access and authorisation rules. >>

<< The design of the identity and access management architecture can be guided by the IAM Architecture Framework, which is composed of several architectural views. >>

Process view	*Processes and use cases describe the behavior of the solution seen by end users and other external entities.*
Logical view	*Solution logical elements, their responsibilities, interfaces, and primary interactions that realize the system's use cases.*
Information view	*How the solution stores, manipulates, manages, and distributes information.*
Deployment view	*The physical environment, including hardware nodes that the system software executes.*

TEMPLATE

Project Acronym: **EPIC**

Grant Agreement number: **270895**

Project Title: **European Platform for Intelligent Cities**

EPIC Roadmap for smart Cities

Template 7: Design Phase – EPIC Overall Test Approach

Version: 0.1

Authors:

Project co-funded by the European Commission within the ICT Policy Support Programme		
Dissemination Level		
P	Public	
C	Confidential, only for members of the consortium and the Commission Services	

1. Introduction

An EPIC project is a project undertaken by a city or city administration to take up the EPIC platform to develop, transform and evolve smart city services in order to become a smart city. For an EPIC project, the EPIC roadmap describes the planned series of actions, tasks and steps to achieve the objectives that are documented in an EPIC Smart City business case.

1.1 Purpose of this Document

Within the design phase of the EPIC project methodology, this document defines the overall testing scope and approach in order to verify that the EPIC service meets the city requirements. The overall testing approach provides the scope, objectives, organisation and set-up for the different types of testing that should be performed in delivering the EPIC service. As a result, the acceptance tests aim to achieve a sign-off by the responsible stakeholders, and could include possible Living Lab testing with selected end-users.

The test approach outlines key elements of the testing methodology that will be used as the guiding principles and common framework for testing the EPIC service. It will further serve as a guiding tool to ensure that the smart city services are delivered and meeting the established quality criteria. As such, this is a living document that will be updated as information changes or becomes available during the service implementation.

1.2 Content of this Document

This document provides first a description of the overall testing strategy, including the different types of testing, the process, team set-up and planning.

The overall EPIC test approach is composed of 2 major phases: 'Closed User Group' testing and 'Open User Group' testing. Both phases are described in detail, including the following elements:

- Objectives
- Scope
- Test environment description
- Test scripts
- Assumptions
- User recruitment and management
- Test execution
- Evaluation of conclusions on testing

2. Testing Strategy

2.1 Overall EPIC Testing Approach

Testing is an activity aimed at evaluating a capability or characteristic of a system in order to determine that it meets the requirements as defined in the system blueprints.

An important aspect within the EPIC testing approach is the deployment of test pilots in order to test the smart city services in a real life environment. This is also referred to as the Living Labs methodology. The methodology enables users to take active part in the design and development process by confronting them with prototypes and demonstrations of the system and the technology from the early stages of the development process.

In general, the Living Labs methodology distinguishes between two major phases:

- Phase 1: **Closed User Group Testing**
- Phase 2: **Open User Group Testing**

2.2 Types of Testing for EPIC

<< In the following table, a list is provided of the different types of testing that are identified for the implementation of an EPIC service. >>

Testing Type	*Description*
Unit testing	*Unit testing validates that individual components of the EPIC service are configured and implemented to appropriately translate the technical and functional requirements. The components of the EPIC service itself only need to be tested for their adaptations to the specific city requirements.* *The unit testing would include testing of developed data integration components, data transactions, component functionalities and interfaces, etc.*
String testing	*String testing comprises of tests which focus on the complete and integrated EPIC service. The functionality of multiple components and their interactivity with each other is tested to satisfy the functional requirements for the EPIC service. These tests ensure complete integration compatibility and capabilities of the EPIC service with the possible city and SME services.*
Integration testing	*Integration testing covers all impacted systems (e.g. from*

	the EPIC platform, the city and SMEs) and their integration with the EPIC service. This test validates the EPIC service based on the functional and integration requirements as defined in its design.
Acceptance testing	*The objective of acceptance testing is to ensure that the EPIC service meets the requirements from the city and end-users. Acceptance testing consists of the user acceptance and validation of expected service functionalities by end-users and relevant stakeholders (such as city administrations). Possible end-user tests include the complete, end-to-end process testing in a Living Lab context.*
Performance testing	*Performance testing is the process of testing to validate performance of the entire technical architecture, including the EPIC platform and service components. This test could consist of simulating application load and using virtual users and batch jobs to measure response time, latency, and throughput and resource utilisation of the EPIC service.*
Environment testing	*Environment testing is the process of testing the operational EPIC environment after the development and deployment of the related services (e.g. city and SME services), but before it is handed over to the end users. This test will help ensure that the EPIC environment is operational within the city context.*
Disaster recovery testing	*Disaster recovery testing is the process of validating disaster recovery plans for the different services involved in the EPIC service, including the EPIC platform, the city and SME services, etc. The disaster recovery plans will need to be defined at the city and the SME levels.*

2.3 Testing Process

<< Define the steps of the testing process for both closed and open user group testing, starting from test planning to preparation, specifications, execution and completion. Identify the test cycles or iterations that will take place in the testing process. >>

2.4 Test Team Set-Up

<< Define the organisational structure, the list of roles and responsibilities and an estimation of the workload of the selected participants in the different types and steps of the testing

process. For the testing team, clear responsibilities should be assigned for defining and executing the test scripts and signing off the test results >>

2.4.1 Organisation

2.4.2 Roles and Responsibilities

Role Title	*Team Member*	*Description of Primary Responsibilities within the Process*
<< Define the role. >>	*<< Assign team members to the role. >>*	*<< Define the main responsibilities and tasks associated with the role. >>*

2.4.3 Resources and Workload

Test Activity	*Driver*	*Average Productivity Rate*	*Total Resources Required*
<< Define test activity based on test process. >>	*<< Define the driver (e.g. number of test scripts, etc.) >>*	*<< Define estimated production rate (e.g. number of test scripts per day / users, etc.) >>*	*<< Calculate estimated total resources required (driver X production rate). >>*

2.5 Test Planning

<< Insert a timeline Gantt chart below that will depict the project's overall testing timeline. This should however, be detailed enough to show when each test phase, process step, test type and test cycle is scheduled to start and finish. >>

3. Closed User Group and Open User Group Testing

3.1 Objectives

In the first phase the test pilot will be deployed in a limited, **closed user group**. The goal of this phase is to make sure that the services are, from a technical point of view really working. Particular focus is on testing the technical performance (e.g. the stability) of the solution. Also initial tests will be performed to ensure the smart city services meet the initial user requirements regarding functionality and usability. The users within this phase will be technological confident. The experiences of this test phase will flow back to the technical development teams in order to deploy each of the services in an open, larger community during the next phase.

The **open user group test** pilot is deployed in the open, larger community. The user group should be representative for the population of end-users, and might contain users that are less technological confident. The main objective is to test the user acceptance and experience for the smart city services and the EPIC platform by measuring the utility and usability of the solution. The user testing will focus on both the service and integration with the platform and its performance. In addition the interoperability and interfaces between the different services and existing systems can be put to the test.

The details for both the closed user group and the open user group testing will include the following sections, including the scope, test environment, test scripts,

3.2 Scope

<< Define the components and functionalities of the EPIC service or related components that are in and out of scope for this testing phase. Describe the types of testing and testing activities that will be performed. >>

Requirements Scoped by Test Type				
#	*Requirements Description*	*Impacted Application / Service Component*	*Test Type*	*Responsible*
<< Nr. >>	*<< Provide a description of the test requirement. >>*	*<< Define the application or service component that will be tested for this test requirement. >>*	*<< Define the corresponding test type(s) (user acceptance, unit, integration, etc.) >>*	*<< Define the responsible person. >>*

3.3 Test Environment Description

<< Describe the infrastructure, applications and data requirements for executing this testing phase. In general, the testing could be performed in a development, testing or production environment, which is a dedicated set of infrastructure, application and data resources. >>

3.3.1 Infrastructure

Environment	*Description*	*New or Existing Environment*	*Test Types Utilizing Environment*
<< Name of the infrastructure component. >>	*<< Describe the infrastructure component in terms of stand-alone, integrated, production like, shared, and so on. >>*	*<< Indicate if utilizing an existing component or if a new component is required to be built. >>*	*<< Indicate the Test Types that will be utilizing this infrastructure component. >>*

3.3.2 Applications

Environment	*Description*	*New or Existing Environment*	*Test Types Utilizing Environment*
<< Name of the application/service component. >>	*<< Describe the component in terms of stand-alone, integrated, production like, shared, and so on. >>*	*<< Indicate if utilizing an existing component or if a new component is required to be built. >>*	*<< Indicate the Test Types that will be utilizing this application/service component. >>*

3.3.3 Data

3.4 Test Scripts

<< Document the concrete test scripts that will be used in the execution of the tests in this phase. A summary of the test case and a description of the steps and expected results should be provided. >>

Test Script ID			*<< Define unique test script identification number. >>*			
Test Script Name			*<< Provide test script name. >>*			
Test Cycle			*<< Define the test cycle in which the test script will be used. >>*			
Step #	***Step Description***	***Inputs***	***Test Case Data***	***Expected Outputs***	***Dependencies on Other Test Scripts***	***Actual Result***
<< Nr. >>	*<< Describe the actions that need to be performed in the test scripts. >>*	*<< Describe the inputs required for the test script. >>*	*<< Identify and describe the data sets used in the test step. >>*	*<< Describe the expected results of the test script. >>*	*<< Identify and describe any dependencies between the current test step and other test scripts. >>*	*<< Describe the actual result obtained by performing the test script. >>*

3.5 Assumptions

<< Describe the relevant assumptions that should be taken into account for the execution of the test scripts, for example the limitations of system functionalities, components or data. >>

3.6 Users Recruitment and Management

3.6.1 Profiling

<< Describe how the test pilot will select, recruit, retain, inform, train and support users. Define the number of users required for the test. Describe the required user profile or user type and the corresponding selection criteria (e.g. skills and experience).Describe the type and level of participation required by the users. >>

3.6.2 Recruitment and Selection

<< Describe the approach to recruit and select users with the appropriate profile (e.g. social media, email, calls, etc.). >>

3.6.3 Support and Training

<< Define how users should be trained and supported to ensure they have the right skills and are well informed about what is expected from them. >>

3.7 Test Execution

3.7.1 Test Process

<< Define the detailed steps of the testing process, starting from test planning to preparation, specifications, execution and completion. >>

3.7.2 Data Capture and Analysis

<< Define how feedback from user experiences will be captured during the testing (e.g. surveys, interviews, analytics on the services and platform itself, etc.). Define an evaluation method for analysis of both the qualitative and the quantitative data. Identify and take into account the EU-level and national legal requirements related to the protection of (personal) data. >>

3.7.3 Defect Handling

<< Describe the process for handling defects that are captured during the testing process, for example listing the identified defects in a defect tracking spreadsheet. Status attributes should be defined to track the defect during its lifecycle. >>

Defect Severity Guidelines				
Severity	***Definition***	***Target Turnaround Time***	***Responsible***	***Escalate to***
Critical	*Very severe. Entire application, component, or function will not work. Client, system or environment is unavailable. No work-around available. Severe data loss or corruption. Data integrity issue related to security, confidentiality, legal, or regulatory non-compliance. "Blocking defect". Intermittent defects that result in any of the above are also classified as Critical.*	*x hour turnaround*		
High	*Significant. Entire application, component or function will not work. A work-around is available. Corruption of a critical component. Loss of a non-critical component. Intermittent defects that result in any of the above are also classified as*	*n day turnaround*		

Defect Severity Guidelines				
	High.			
Medium	*Result is not as expected. Corruption of a non-critical component. Work-around is available. Low impact to the end user or application. Intermittent defects that result in any of the above are also classified as Medium.*	*n week turnaround*		
Low	*Minor defect. Some of the application operations are unexpected. Intermittent defects with low impact to the business operations or end users*	*n week turnaround* *Should resolve as many as possible before go-live*		

4. Evaluation of Conclusions on Testing

<< Describe the conclusions derived from the closed user group and open user group testing phase and evaluate them (e.g. have the appropriate scripts been tested, was the size and profile of the user group appropriate, did all functionalities get tested, outstanding defects, etc.). Describe the criteria for evaluating if this testing phase could be closed. >>

Annex I: Example Test Team Set-Up for EPIC

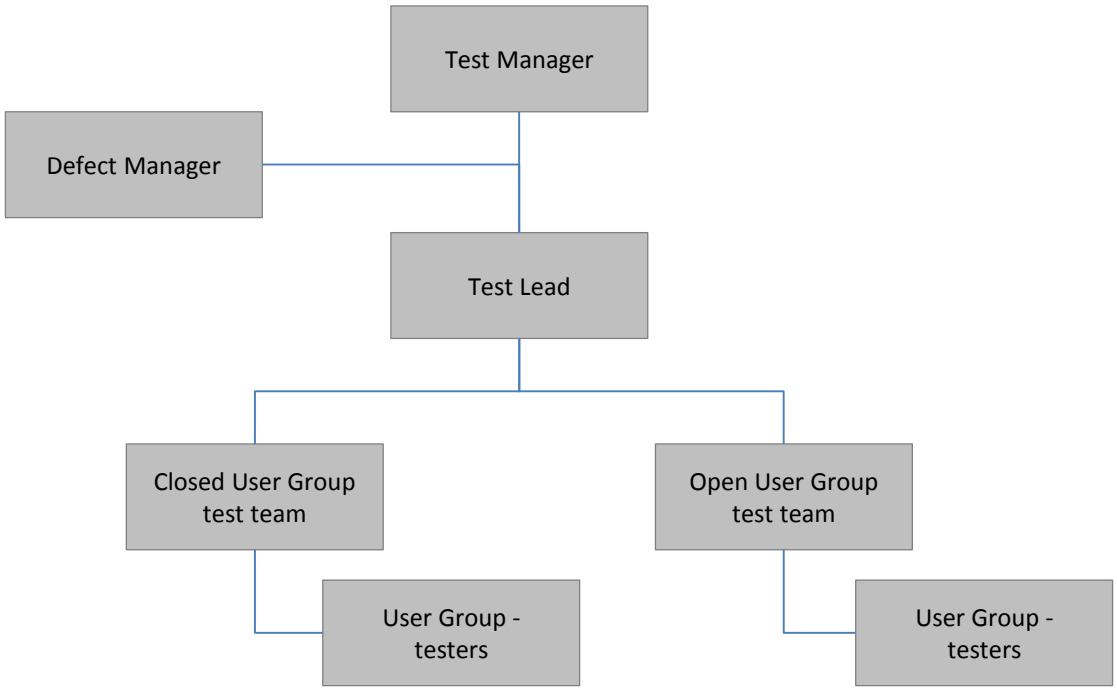


Figure 18 - Organisation of the Test Team for EPIC

Role Title	*Team Members*	*Description of primary responsibilities within the process*
Test Manager		• *Develop the overall approach, sizing, and test plan; and monitoring progress against the plan.* • *Manage, direct, and coordinate the activities across all teams to make sure testing starts on schedule, makes progress, and entry/exit criteria are met.* • *Determine that the integrity of the testing process is maintained through the enforcement of change management processes and adherence to testing methodology and plans.* • *Approve all changes to the test environment.* • *Review the quality criteria against business requirements and standards.*
Test Lead		• *Develop detailed test plans for each test phase, cycle and test type.* • *Perform review of the test scenarios, cases, and scripts.* • *Manage execution for each test phase, cycle and test type.* • *Provide daily summary reports of test execution and defect resolution.*
Test Team		• *Write detailed test scripts for each test cycle.* • *Select and recruit user group.* • *Provide user group training.* • *Identify and validate data requirements for each test phase.* • *Manage and coordinate test data creation, collection, and modification.* • *Facilitate the execution of the test scripts for test cycle.* • *Capture and analyse data.* • *Detect and log defects with all necessary information for advanced troubleshooting.*
User Group - Testers		• *Participate in "Living Lab" testing.*

Defect Manager	• *Collect and validate new defects and verify they are properly documented before opening.* • *Make sure all defects are addressed in a timely manner and escalate to Test Manager as appropriate.* • *Work closely with the technical team and developers as necessary to resolve and/or retest defect.* • *Conduct defect reporting.*

TEMPLATE

Project Acronym: **EPIC**

Grant Agreement number: **270895**

Project Title: **European Platform for Intelligent Cities**

EPIC Roadmap for Smart Cities

Template 8: Build Phase – EPIC Service Release Readiness Criteria

Version: 0.1

Authors:

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Dissemination Level		
P	Public	
C	Confidential, only for members of the consortium and the Commission Services	

1. Introduction

An EPIC project is a project undertaken by a city or city administration to take up the EPIC platform to develop, transform and evolve smart city services in order to become a smart city. For an EPIC project, the EPIC roadmap describes the planned series of actions, tasks and steps to achieve the objectives that are documented in an EPIC Smart City business case.

The service release readiness criteria provide an approach for cities or city administrations to evaluate the development status of the EPIC service and determine if the service is ready for deployment.

This service release readiness criteria document is an important deliverable of the build phase when implementing the project management framework of an EPIC project.

1.1 Purpose of this Document

After the development and testing of the EPIC service, a checklist should be used to evaluate the readiness of the EPIC service for actual production in the city. In this document, the guidelines are provided for the definition, use and evaluation of these service readiness criteria. These criteria are used to evaluate the readiness of an EPIC service for the specific domains that are applicable.

This document provides input for the activity in the deliver phase where the readiness criteria are actually evaluated. Based on the evaluation of these readiness criteria, a decision could be taken on the deployment of the EPIC service in the city.

1.2 Content of this Document

In this document, the guidelines for the definition, use and evaluation of the service readiness criteria are described in the following chapter.

Next, the criteria for the evaluation of the EPIC service readiness are defined for the following domains:

- Processes and applications
- Technology
- Infrastructure
- Security
- Production deployment and cutover
- Service support
- Business operations

2. EPIC Service Release Readiness Guidelines

This section describes the steps for defining, validating and using the release readiness criteria in the build phase of an EPIC project. Also the approach and procedures for the evaluation of the release readiness criteria in the deliver phase of the EPIC project are defined here. Furthermore, the guidelines should describe the responsible person for defining, validating, using and evaluating the readiness criteria. In these guidelines, the necessary components at technical and organisational level are identified that are necessary for the deployment and operation of an EPIC service.

2.1 Definition of Service Release Readiness Criteria

<< Describe the steps and procedures for defining and validating the set of release readiness criteria in the build phase of the EPIC project. A responsible person for defining and validating the readiness criteria should be assigned. The readiness criteria should be identified based on the technical and organisational components involved in the deployment and operation of an EPIC service. >>

<< In the following table, a list is provided of the different types and sub-categories of service release readiness criteria that can be identified for the implementation of an EPIC service. >>

Category	Readiness Criteria	Readiness Sub-criteria
Process and Application Readiness	***Process Readiness***	▪ *Clearly defined procedures* ▪ *Clearly defined roles and responsibilities*
	Application Readiness	▪ *Customisations and configuration are tested and meet service requirements* ▪ *Data analysis and reporting requirements are met and tested*
	Integration / Interface Readiness	▪ *Integration with (cloud) platform established and tested* ▪ *Interface with other smart city services established and tested* ▪ *Interface with business partners / SMEs applications established and tested*
	Testing Readiness	▪ *Test plan executed and defects solved appropriately*
Technological Readiness	***Platform Readiness***	▪ *Appropriate platforms in place* ▪ *Appropriate protocols in place* ▪ *Appropriate standards in place*
	Technical Requirements Readiness	▪ *Performance* ▪ *Interoperability* ▪ *Maintenance operations* ▪ *Reliability* ▪ *Availability*

		▪ *Security* ▪ *Usability* ▪ *Regulatory*
Infrastructure Readiness	***Hardware Readiness***	▪ *Server infrastructure readiness* ▪ *User infrastructure readiness (desktops, mobile devices, sensors, terminals, etc.)*
	Network Readiness	▪ *Stability* ▪ *No single-point-of-failure* ▪ *Remote access has been tested*
	Data Storage Readiness	▪ *Database structure readiness* ▪ *Back-up successfully tested*
Security Readiness	***Security Control Readiness***	▪ *Application controls and control values defined and in place* ▪ *Security policies in place* ▪ *Security processes and structures implemented* ▪ *Tooling implemented (security monitoring)*
	Identity and Access Management Readiness	▪ *IAM solution established and tested* ▪ *Clearly defined user roles and access rights*
Production Deployment and Cutover Readiness	***Deployment and Cutover Plan Readiness***	▪ *Cutover scenarios defined* ▪ *Cutover activities identified and rehearsed* ▪ *Resources defined and assigned*
	Data Conversion and Migration Readiness	▪ *Data cleansing completed* ▪ *Data conversion completed*
	Content and external service providers Readiness	▪ *Vendor / provider support agreements are in place*
	Deployment support Readiness	▪ *Support centre has been set up*
Service Support Readiness	***Support Level Readiness***	▪ *Support plan defined and approved* ▪ *Clearly defined Service Level Agreements*
	Support Process Readiness	▪ *Incident reporting and tracking procedures in place* ▪ *Problem management procedures in place* ▪ *Change request procedures in place*

		▪ *Maintenance procedures in place*
	Support Resources and Staffing Readiness	▪ *General support team (level 1 support) is staffed* ▪ *Central support team (level 2 support) is staffed* ▪ *Expert support team (level 3 support) is staffed* ▪ *Support staff has been trained*
	Support Facilities Readiness	▪ *Help desk has been set up (PCs, phones, etc.)*
	Support Tooling Readiness	▪ *Ticketing system in place and tested* ▪ *Monitoring tools in place and tested (application monitoring, server monitoring, network monitoring, etc.)*
Business Operations Readiness	***Organisational Readiness***	▪ *Appropriate governance, structures and culture / mind set in place* ▪ *Sufficient staffing availability*
	Legal, Contract and Financial Readiness	▪ *Legal readiness* ▪ *Contract readiness* ▪ *Financial readiness*
	Adoption Readiness	▪ *Change management plans defined and implemented* ▪ *Openness to change*
	End-user Readiness	▪ *Training course developed* ▪ *Training tools and training environment established and tested* ▪ *Training schedule defined and completed*
	Communication Readiness	▪ *Communication plans defined* ▪ *Communication channels established* ▪ *Level of awareness*
	Business Continuity Readiness	▪ *Disaster recovery plan defined and tested*

2.2 Use of Service Release Readiness Criteria

<< Describe the steps and procedures for using the set of release readiness criteria in the deliver phase of the EPIC project. A responsible person for using the readiness criteria should be assigned. The status, progress and issues for each readiness criterion will be defined and reported. >>

2.3 Evaluation of Service Release Readiness Criteria

<< Describe the steps and procedures for the evaluation of the release readiness criteria in the deliver phase of the EPIC project. A responsible person for evaluating the readiness criteria should be assigned. Based on the status, progress and issues for the readiness criteria, an evaluation is made in order to decide on the deployment and operation of the EPIC service within the city. The procedures should describe how the decision should be made, and what the consequences are of a go or no-go decision. >>

3. EPIC Service Release Readiness Criteria

In this section the complete set of release readiness criteria for deployment and operation of the EPIC service will be described and evaluated. The following sections are provided in order to identify both the technical and organisational criteria for the readiness of an EPIC service.

3.1 Business Operations Readiness

<< Are the end users (e.g. citizens or businesses), city administrations and SMEs ready to perform their work with the new processes and new systems of the EPIC service? >>

Readiness Criteria	*Description*	*Minimum Requirement*	*Impact*	*Evaluation*	*Mitigation strategy*	*Conclusion*
Organisational Readiness	*<< Provide a more detailed description of the readiness criterion. >>*	*<< Define the minimum requirement that must be met to meet the criterion, in order to allow an objective assessment. >>*	*<< What will be the impact when the criterion is not met before go-life. >>* *High/Medium /Low*	*<< Evaluate the criterion by determining to what extend the minimum requirement is met. >>* *Green / Orange / Red*	*<< Define what actions should be implemented to mitigate the issues related to the criterion. >>*	*<< Define the go-life recommendation. Indicate whether go-live should be delayed or if work around will be implemented. >>*
Legal, Contract and Financial Readiness						
Adoption Readiness						
End-user Readiness						
Communication Readiness						
Business Continuity Readiness						
	Overall conclusion for readiness criteria category:					

3.2 Process and Applications Readiness

<< What are the assessment items for evaluating the readiness of the implemented application and processes related to the EPIC service? >>

Readiness Criteria	*Description*	*Minimum Requirement*	*Impact*	*Evaluation*	*Mitigation strategy*	*Conclusion*

Process Readiness	*<< Provide a more detailed description of the readiness criterion. >>*	*<< Define the minimum requirement that must be met to meet the criterion, in order to allow an objective assessment. >>*	*<< What will be the impact when the criterion is not met before go-life. >>* *High/Medium /Low*	*<< Evaluate the criterion by determining to what extend the minimum requirement is met. >>* *Green / Orange / Red*	*<< Define what actions should be implemented to mitigate the issues related to the criterion. >>*	*<< Define the go-life recommendation. Indicate whether go-live should be delayed or if work around will be implemented. >>*
Application Readiness						
Integration/ Interface Readiness						
Testing Readiness						
	Overall conclusion for readiness criteria category:					

3.3 Technological Readiness

<< What are the assessment items for evaluating the readiness of the technologies and platforms used to support the implementation of the EPIC service in the city? >>

Readiness Criteria	*Description*	*Minimum Requirement*	*Impact*	*Evaluation*	*Mitigation strategy*	*Conclusion*
Platform Readiness	*<< Provide a more detailed description of the readiness criterion. >>*	*<< Define the minimum requirement that must be met to meet the criterion, in order to allow an objective assessment. >>*	*<< What will be the impact when the criterion is not met before go-life. >>* *High/Medium /Low*	*<< Evaluate the criterion by determining to what extend the minimum requirement is met. >>* *Green / Orange / Red*	*<< Define what actions should be implemented to mitigate the issues related to the criterion. >>*	*<< Define the go-life recommendation. Indicate whether go-live should be delayed or if work around will be implemented*
Technical Requirements Readiness						
	Overall conclusion for readiness criteria category:					

3.4 Infrastructure Readiness

<< What are the criteria to ensure the appropriate technical infrastructure in place to support the deployment of the EPIC service in the city? >>

Readiness Criteria	*Description*	*Minimum Requirement*	*Impact*	*Evaluation*	*Mitigation strategy*	*Conclusion*
Hardware Readiness	*<< Provide a more detailed description of the readiness criterion. >>*	*<< Define the minimum requirement that must be met to meet the criterion, in order to allow an objective assessment. >>*	*<< What will be the impact when the criterion is not met before go-life. >>* *High/Medium /Low*	*<< Evaluate the criterion by determining to what extend the minimum requirement is met. >>* *Green / Orange / Red*	*<< Define what actions should be implemented to mitigate the issues related to the criterion. >>*	*<< Define the go-life recommendation. Indicate whether go-live should be delayed or if work around will be implemented*
Network Readiness						
Data Storage Readiness						
	Overall conclusion for readiness criteria category:					

3.5 Security Readiness

<< Define the appropriate readiness criteria to ensure adequate security controls have been designed into the processes related to the EPIC service and how security does enforce these control. >>

Readiness Criteria	*Description*	*Minimum Requirement*	*Impact*	*Evaluation*	*Mitigation strategy*	*Conclusion*
Security Control Readiness	*<< Provide a more detailed description of the readiness criterion. >>*	*<< Define the minimum requirement that must be met to meet the criterion, in order to allow an objective assessment. >>*	*<< What will be the impact when the criterion is not met before go-life. >>* *High/Medium /Low*	*<< Evaluate the criterion by determining to what extend the minimum requirement is met. >>* *Green / Orange / Red*	*<< Define what actions should be implemented to mitigate the issues related to the criterion. >>*	*<< Define the go-life recommendation. Indicate whether go-live should be delayed or if work around will be implemented*
Identity and Access Management Readiness						
	Overall conclusion for readiness criteria category:					

3.6 Production Deployment and Cutover Readiness

<< What are the assessment items for evaluating the deployment support plans related to the deployment of the EPIC service? Is the cutover of the systems and data ready for production cutover of the EPIC service? >>

Readiness Criteria	Description	Minimum Requirement	Impact	Evaluation	Mitigation strategy	Conclusion
Deployment and Cutover Plan Readiness	<< Provide a more detailed description of the readiness criterion. >>	<< Define the minimum requirement that must be met to meet the criterion, in order to allow an objective assessment. >>	<< What will be the impact when the criterion is not met before go-life. >> High/Medium /Low	<< Evaluate the criterion by determining to what extend the minimum requirement is met. >> Green / Orange / Red	<< Define what actions should be implemented to mitigate the issues related to the criterion. >>	<< Define the go-life recommendation. Indicate whether go-live should be delayed or if work around will be implemented
Data Conversion and Migration Readiness						
Content and external service providers Readiness						
Deployment support Readiness						
	Overall conclusion for readiness criteria category:					

3.7 Service Support Readiness

<< Are the support resources and processes in place to monitor and report issues in order to ensure continuous business operations for the EPIC service? >>

Readiness Criteria	Description	Minimum Requirement	Impact	Evaluation	Mitigation strategy	Conclusion
Support Level Readiness	<< Provide a more detailed description of the readiness criterion. >>	<< Define the minimum requirement that must be met to meet the criterion, in order to allow an objective assessment. >>	<< What will be the impact when the criterion is not met before go-life. >> High/Medium /Low	<< Evaluate the criterion by determining to what extend the minimum requirement is met. >> Green / Orange / Red	<< Define what actions should be implemented to mitigate the issues related to the criterion. >>	<< Define the go-life recommendation. Indicate whether go-live should be delayed or if work around will be implemented. >>
Support Process						

Readiness
Support Resources and Staffing Readiness
Support Facilities Readiness
Support Tooling Readiness

Overall conclusion for readiness criteria category:

TEMPLATE

Project Acronym: **EPIC**

Grant Agreement number: **270895**

Project Title: **European Platform for Intelligent Cities**

EPIC Roadmap for Smart Cities

Template 9: Deliver Phase – EPIC Service Cutover and Deployment Plan

Version: 0.1

Authors:

Project co-funded by the European Commission within the ICT Policy Support Programme		
Dissemination Level		
P	Public	
C	Confidential, only for members of the consortium and the Commission Services	

1. Introduction

An EPIC project is a project undertaken by a city or city administration to take up the EPIC platform to develop, transform and evolve smart city services in order to become a smart city. For an EPIC project, the EPIC roadmap describes the planned series of actions, tasks and steps to achieve the objectives that are documented in an EPIC Smart City business case.

The cutover and deployment plan provides the steps and checks for cities or city administrations to actually put an EPIC service into a production environment. This plan is a vital deliverable for deciding on the progress from the deliver phase to the operate phase.

This cutover and deployment plan is an important deliverable of the deliver phase when implementing the EPIC service within an EPIC project.

1.1 Purpose of this Document

The objective of the cutover and deployment plan is to assist and guide the teams in the deployment of the EPIC service into an actual operating environment. The cutover and deployment plan provides the strategy, approach, planning, resources, activities and controls for executing the actual cutover and deployment of the EPIC service. The cutover plan will be a specific and critical aspect in the overall deployment strategy and will be described as detailed as necessary.

1.2 Content of this Document

This document provides the details for the overall deployment strategy and the actual cutover plan. In the deployment strategy, the approach, the assumptions and constraints, the critical success factors, and risk management procedures are described in order to manage the deployment activities. In the cutover plan, the detailed cutover scenarios, the cutover planning, the risk mitigation plan, and the recovery procedures are described.

2. Deployment Strategy

The deployment strategy for an EPIC service outlines the overall approach and detailed activities for executing the deployment of the EPIC service into an operational environment. The deployment strategy will also provide the necessary management activities to ensure the teams, resources, and infrastructures are supporting the deployment and cutover activities in the most efficient and effective way.

2.1 Deployment Approach

<< Describe the overall steps and activities that would be included in the deployment of the EPIC service. Describe the objectives and scope of the deployment activities for the EPIC service. >>

2.1.1 Release and Deployment Planning

<< Provide a detailed planning of the phases, steps and activities for the deployment of the EPIC service. This plan will include the milestones, checkpoints and decisions to be taken in the deployment of the service. >>

2.1.2 Deployment Roles and Responsibilities

<< Identify and describe the detailed roles and responsibilities that are required in the execution of the deployment activities. Provide an overall team approach for the deployment and detailed cutover activities, including possible back-up resources. >>

2.2 Assumptions and Constraints

<< Detail the assumptions and constraints in terms of the EPIC service and platform, the external service providers and the city administrations. The assumptions and constraints can relate to the planning, resources, teams, aspects, dependencies, etc. of the deployment. The constraints can include technical (e.g. infrastructure) or organisational (e.g. resources) limitations. >>

2.3 Critical Success Factors

<< Describe the critical success factors for the deployment of the EPIC service in order to manage the overall outcomes of the deployment activities. >>

2.4 Risk Management

<< Describe the procedures and steps for managing the risks that are identified for the deployment of the EPIC service. In this risk management, the identified risks could be ignored, resolved, mitigated or transferred based on a risk impact analysis and probability estimate. >>

3. Cutover Plan

The cutover plan details the elementary steps that should be performed to transfer the EPIC service into an actual production environment. In order to define the detailed activities, different scenarios for the cutover of the EPIC service could be identified and selected first.

3.1 Cutover Scenario Description

<< Describe the different identified scenarios for the execution of the cutover of the EPIC service. These scenarios can be identified based on the activities that need to performed, the resources, roles and responsibilities that are available, or the assumptions and constraints that limit the different cutover scenarios. >>

3.2 Cutover Plan

<< Describe in as much detail as possible the steps that need to be performed in order to transfer the EPIC service to the production environment of the EPIC platform. This cutover plan includes an ordered set of tasks (including preparation tasks), and for each task an estimated completion time and assigned responsibilities. Furthermore, intermediary checkpoints can be defined in order to manage the cutover cycle. >>

3.3 Risk Mitigation Plan

<< Describe the procedures and options for handling the identified risks and issues during the execution of the cutover of the EPIC service. >>

3.4 Recovery Procedures

<< Describe the procedures for the recovery of the EPIC service and related systems to an initially defined state. Describe the decision making process and responsibilities for the actual initiation of the recovery procedures during the cutover plan and overall deployment plan. >>

TEMPLATE

Project Acronym: **EPIC**

Grant Agreement number: **270895**

Project Title: **European Platform for Intelligent Cities**

EPIC Roadmap for Smart Cities

Template 10: Operate Phase – EPIC Service Provisioning

Version: 0.1

Authors:

Project co-funded by the European Commission within the ICT Policy Support Programme		
Dissemination Level		
P	Public	
C	Confidential, only for members of the consortium and the Commission Services	

1. Introduction

An EPIC project is a project undertaken by a city or city administration to take up the EPIC platform to develop, transform and evolve smart city services in order to become a smart city. For an EPIC project, the EPIC roadmap describes the planned series of actions, tasks and steps to achieve the objectives that are documented in an EPIC Smart City business case.

The service provisioning document provides the details for operating, controlling, maintaining and financing the EPIC service for all relevant stakeholders (including city administration, platform operators, service provider, etc.). This document is a vital deliverable for the operate phase when providing the operational EPIC service within a city context.

1.1 Purpose of this Document

The objective of the service provisioning document is to describe the details for operating, controlling, maintaining and financing the EPIC service. This document provides a detailed description of the provided services in order to define roles and responsibilities to ensure the consistency, availability and security of the service.

In a next step, this document would be used as main input for the establishment of legal agreements between the different actors in delivering the EPIC service.

1.2 Content of this Document

In the first part, the scope and functionalities of the provided EPIC service is described. Next, the service levels are defined for the operations of the EPIC service, including guiding principles, service levels and possible measurements. Based on these service levels, the service management principles, organization, roles and responsibilities are defined. For the financial structure, the guiding principles, the charging principles, models and process are described in more detail. Finally, the consideration of legal aspects are investigated and described for the establishment of legal agreements between the actors.

2. Scope of Service

This service provisioning document describes in detail the EPIC service that is provided within the city context. The description of the EPIC service concerns the different actors that are involved and responsible for the operational aspects, being the service providers and receivers.

2.1 Service Provider and Receiver

<< Describe the concrete service providers and receivers in the operation of the EPIC service, for example including the city IT department, the EPIC platform operator, etc. This should provide a clear identification of the different actors in the operation of the service. >>

2.2 Scope of Service

<< Identify the elements of scope for the EPIC service, for example in terms of the potential service consumers, the data structures, the technical connectivity, etc. Describe for these elements of scope the detailed boundaries of in- and out of scope for the EPIC service. >>

2.3 Service Description

<< Describe in detail the objectives, functionalities, and outcomes of the EPIC service. This should provide a general overview of the service which is understandable for interested external parties. >>

2.4 Period of Service

<< Describe the operational periods for the EPIC service in terms of hours, days, weeks, months or years. This is an important aspect, since this will indicate the moment when the Service Provisioning Agreement will be effective.

Furthermore, describe the general principles for the periods of maintenance or planned interruptions. >>

2.5 Glossary of terms

<<A Glossary of terms used to describe specific aspects of the service. This will enable a clear understanding by all stakeholders.>>

3. Service Levels

The service levels provide the requirements and expectations for the performance of the EPIC service. The service levels are defined taking into account the scope and periods for service. These service levels will provide the main input for defining the EPIC service management, charging structures and legal aspects.

3.1 Guiding Principles

<< Describe the overall guiding principles for the effective performance of the provided EPIC service. These principles should take into account the scope, the description and the period of service as defined in previous sections. >>

3.2 Service Specifications

<< Describe the technical and data specifications related to the implemented EPIC service. These specifications would include the standards, interfaces, data structures and other aspects of the service. >>

3.3 Service levels and KPIs

<< Describe the specific service levels as the required levels of performance for the provided EPIC service, possibly including levels of accessibility, availability, response times, etc. These levels should be measurable in terms of key performance indicators which should be defined for the specific service levels. Some examples of KPIs for Cloud can be found in Annex.>>

3.4 Service Measurements

<< Describe the specific procedures for measuring and reporting the performance of the KPIs and service levels related to the EPIC service. A reporting period should be agreed with the relevant stakeholders, and actions could be taken accordingly (i.e. setting penalties). >>

3.5 Penalties

<< Describe the potential penalties applicable for the service consumers when the agreed service levels and KPIs are not attained, using the service measurements. Different levels of penalties could be defined and assigned to the defined service levels and KPIs. It is important to provide a means to calculate the metrics specified in the SLA and provide clear rules to determine whether an SLA violation has occurred and whether it has financial penalties as a consequence. >>

4. Service Management

The operational EPIC service needs to be actively managed in relation to the service specifications, requirements and service levels. These management processes need to be implemented specifically for the EPIC service that is provided. However, it could be supported by the EPIC governance organization.

4.1 Guiding Principles

<< Describe the guiding principles for managing the provided EPIC service, in terms of the responsible organisation, the roles and responsibilities of the different actors, the management processes and procedures, etc. >>

4.2 Service Organization

<< Describe the concrete organisational structure and the actors for the management of the EPIC service. Highlight the specific boundaries and scope which needs to be managed by the specific actors. >>

4.3 Roles and Responsibilities

<< Describe the clear roles and responsibilities of the different actors in the management processes. >>

4.4 Service Management Processes

<< Describe in detail the management processes that are related to the operation of the EPIC service, including the steering committees, technical maintenance procedures, change management process, etc. >>

4.4.1 Service Level Review Process

<< Describe in detail the review process for the service levels, which could be performed monthly, yearly, etc. This review process should include the discussions between all stakeholders, in order to agree on the new service levels for the EPIC service. >>

4.4.2 Customer Satisfaction Process

<< Describe in detail the process for gathering input on the customer satisfaction with the EPIC service. In this process, the possible customers of the service should be identified and surveys or interviews could be performed in order to gather the necessary information. >>

4.4.3 Service Monitoring Process

<< Describe in detail the process, roles and responsibilities for monitoring, measuring and reporting the performance of the EPIC service. A specific timing for performing these monitoring activities should be described. >>

4.4.4 Escalation Processes

<< Describe the different escalation procedures that are possible for the different stakeholders, in order to resolve the issues in operating the EPIC service. These escalation procedures could include internal discussions or meetings, or could be directed towards the legal authorities in the relevant countries applicable. >>

5. Charges for EPIC Service

When the EPIC service is operational, a cost and financial structure should be established with the different actors and stakeholders.

<< Annex III describes the possible financial models for Service provisioning via a cloud solution. The reflection on the most suitable financial model has been done during the planning phase, i.e. while establishing the Business Case. In this document on Service Provisioning, this reflection has to be operationalized.>>

5.1 Guiding Principles

<< Describe the guiding principles for the pricing and financial structure for operating the EPIC service. These principles should highlight the cost aspects and income aspects for providing and consuming the service. >>

5.2 Charging Principles

<< Describe the principles related to the charging and pricing of the EPIC service towards the service consumers. These principles should align with the objectives, scope and functionalities that are provided by the EPIC service and the potential use of the service by consumers. >>

5.3 Charging Model

<< Describe the detailed charging model, including the different actors and transfers between them. >>

5.4 Charging Process

<< Describe the detailed steps and results that need to be performed in order to charge for the use of the service. >>

5.5 Pricing of EPIC Service

<< Provide a detailed list of the possible pricing schemes that are defined for the specific charging model. >>

5.6 Payment Schedule and Information

<< Describe the schedule, deadlines and information for the execution of the payments related to the use of the EPIC service. These schedules and information should align with the legal constraints applicable in the countries involved. >>

5.7 Rules for Pricing Adjustments

<< Describe the timing and communications for the possible adjustments of prices, that should make it clear for all stakeholders involved in providing or using the EPIC service. Highlight the roles and responsibilities in the process of adjusting the prices. >>

6. Legal Aspects of EPIC Service

<< Describe the legal aspects (user rights, data protection, privacy, etc.) that are necessary for the establishment of a legal agreement between the different actors in operating the EPIC service. These legal aspects will be defined based on the specific legal frameworks of the countries involved.

As an illustration some aspects for privacy concern [8] are mentioned hereunder:

- *Compelled disclosure to the government*
  - *Information stored on the cloud is subject to different protections than information stored in-house*
- *Data security and disclosure of breaches*
  - *Generally, how does a cloud provider protect a customer's data?*
  - *When the law imposes data security requirements on a customer, how can the customer ensure its compliance when storing information on the cloud?*
  - *If the cloud's security is breached, must the cloud give notice of the breach?*
- *Transfer of, access to, and retention of data*
  - *Will companies and consumers have access to data on the cloud? Can the cloud confirm the destruction of data or return it?*
- *Location of data*
  - *The physical location of the server storing the data may have legal implications*
- *Consumer notice and choice*
  - *For companies who will store consumers' data on the cloud>>*

These, and many other legal questions, should be dealt with when looking at the legal relationships that will be created between stakeholders.

[8] "Cloud Computing: A Primer on Legal Issues, Including Privacy and Data Security Concerns", Hogan Lovells

Annex I: Metrics for Service Level Agreements

Metrics	Definitions
Throughput	▪ System response time
Reliability*	▪ System availability
Load Balancing	▪ Ability to scale during periods of high traffic
Durability	▪ Likeliness of losing data
Elasticity	▪ Scaling limitations
Linearity	▪ System performance as the load increases
Agility	▪ Response time to load changes
Automation	▪ Number of requests that can be handled without human interaction
Customer Service Response Times	▪ Time it takes customer service to resolve tickets

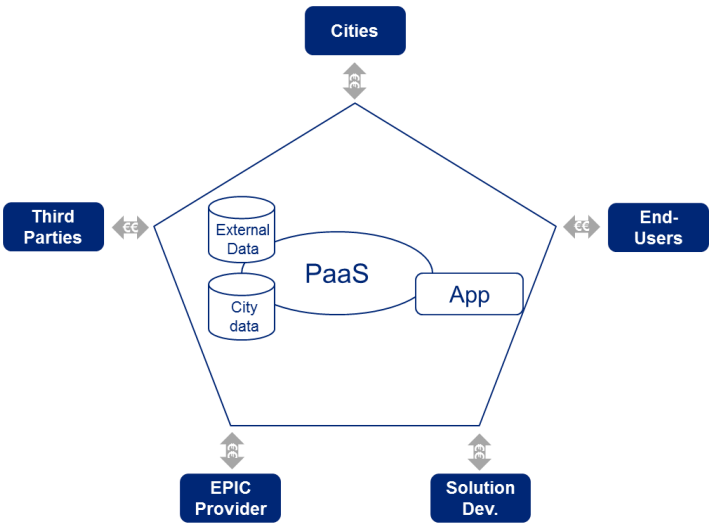
*Reliability (availability) is the most common metric outlined in Cloud SLA's

Some examples to illustrate the way metrics are defined in the marketplace:

Metrics	Availability and Key Point	Source
Amazon Web Services – EC2	▪ Monthly Uptime Percentage of 99.95% ▪ Guarantees 4.3 hours of non-scheduled downtime a year	▪ Comparison of AWS versus Rackspace
Google AppEngine	▪ Monthly Uptime Percentage of 99.5% ▪ Errors Requests that result from Scheduled Maintenance do not count against the SLA	▪ Google AppEngine SLA
Rackspace	▪ Monthly Uptime Percentage of 100% ▪ In terms of credits, Rackspace has no credit cap	▪ Comparison of AWS versus Rackspace
Verizon/Terremark	▪ Monthly Uptime Percentage of 100% ▪ In the event Terremark does not meet the Monthly Uptime Percentage commitment, you will be eligible to receive Service Credit ▪ "Unavailable" means that either the vCloud Express Web Console or infrastructure, and network connectivity, up to the Terremark Network Demarcation Point, are inaccessible by you for the entire fifteen (15) minute period.	▪ Verizon/Terremak SLA

Annex II: Financial Considerations for Service Provisioning

<< In the operational phase of the service via EPIC, it is important that all parties are aligned with regards to the monetary flows. In the image below these flows have been depicted in high-level way. In order to guarantee an optimal operation's phase, it is beneficial if these flows are clear and transparent for all from the start>>



In this context there are key elements to take into consideration:

- *What is the cost of the service?*
- *Who carries which costs?*
- *Which price is applicable that is in line with the objectives and the costs?*
- *How will the price be charged?*
- *How can it be guaranteed that right amount of money arrives at the correct stakeholder?*

In the following three paragraphs a more detailed view on costs, pricing and chargeback related to service provisioning will be provided.

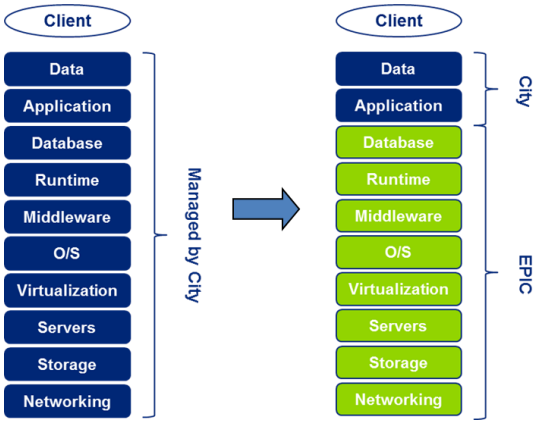
2. Costs

When looking at the costs of the implementation of a service via a cloud platform, it's worthwhile to look at two service delivery models to understand the most important cost elements:

- *The service provision is done "in-house".*
- *A third party platform is used for the provisioning. >>*

In the case of "in-house", the full development, deployment and support of the application is under the responsibility of the city. Next to the hardware components, such as switches, storage devices, physical servers, and the software components, such as RDBMS software, monitoring tools, the human activities play a very important role in the total cost.

If the city chooses a third-party platform (Platform as a Service – PaaS), it has to realize that certain responsibilities will be transferred, but that other activities will remain and will even grow in importance, due to an increased focus on governing the third party.



*The **development and the deployment of the application** remain under the responsibility of the city. Providing the right information to integrate with external data sources is also the responsibility of the city.*
*The **set-up and maintenance costs of the platform** are transferred to another party.*

Some specific activities and costs remain or come into play when choosing for a PaaS solution. Some examples to illustrate this:

- *Mobile applications: If the city wants to make a mobile application available via Apple's appstore, it will need to have a Developer's ID which cost 80€ / year.*
- *Vendor Management: When working with third parties, the vendor management function becomes increasingly important to select the right vendor, follow-up on contract negotiation, checking SLA's, rationalizing different vendor contracts, etc. This will come at an extra cost.*
- *Demand Management: Demand management activities will need further reinforcement as it is key to have the business demand and the technical specifications crystal clear before talking to external service providers.*
- *Implementation and operations: In most of the cases a Database Management System (e.g. Oracle, MySQL) is provided. The city will need to provision the database, create tables, and add data. Next to this the city will need to develop, test and deploy the application on the PaaS environment. If the environment on which the application is deployed experiences problems, the provider will have to take care of this. If there are necessary updates on the OS or the DBMS, the provider will take care of this.*
- *…*

Of course, an important cost is the cost of the service / application the city wishes to deploy. In the context of a city, the following possibilities (non-exhaustive) of financing can exist:

- *Private-Public Participation: the idea is that there exists a close collaboration between the city and one or more private partners to develop and finance a new service / application. To ensure a good working relationship, there has to be a clear benefit for*

both parties: for the private partner the direct or future revenue stream should be clear, for the city it can be that qualitative elements are more important.

- *License based: there is no direct collaboration between the city and another party. The city will "procure" an application, which can be out of the box, open-source, free of charge, etc. There can be (limited) costs related to the fine-tuning of the application if necessary.*
- *Private initiative: a dedicated supplier for the application is allowed to provide the service for the city. The costs and the revenue will be for the private party, with the city actively promoting the use of the application to improve service delivery for the inhabitants, visitors, employees or others.*

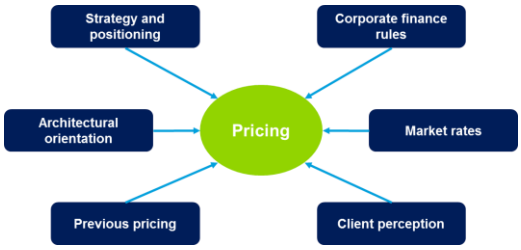
It's clear that manner in which the city desires to obtain the application / service has an important influence on the overall financial model.

As mentioned above, an important aspect is the way the service will generate revenue (if this is an objective). And to do this, a fair price has to be established. This is described in the following paragraph.

3. Pricing

It is possible that the city does not put financial benefits as an objective. If the only thing that is necessary is to provide a service to inhabitants and that a budget is foreseen, the city will only need to look at the costs and how these can be minimized.

However in many cases, it can be interesting to think about the ways revenue can be generated. The image below shows a general view on the elements that drive a pricing strategy.



When looking at the service's ecosystem, there are several "external" stakeholders when looking at things from a city's point of view:

- *Third Party / Supplier of External data*
- *End-User / Client*
- *PaaS / EPIC provider*
- *Solution Developer*

The latter two will not generate revenue in a normal business model, as they cost money to use/build. The two others can generate revenue.

*The **supplier of external data** will most likely charge costs, but it can also generate revenue in the service's ecosystem. Some examples illustrate this:*

- *Real estate agencies want to be integrated in the relocation application of a city. This means a win-win situation for both parties: the city has access to more real estate, and the agencies have an extra communication channel, for which they obviously can be charged.*
- *A touristic application where hotels appear on the touristic map. The latter is powered by e.g. booking.com and for every booking done via this way the city is entitled to a percentage of booking.com's revenue.*
- *…*

It is clear that two aspects are very important to guarantee this kind of revenue generation, namely strong negotiation skills from the city's part and a stable application / service ecosystem.

*Vis-à-vis the **End-user / Client** there are two major decisions for the city to take:*

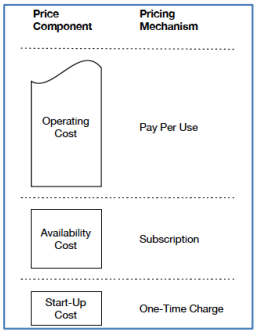
a. *Is the end-user going to be charged for the use of the service / application?*
b. *If so, what is the pricing mechanism that will be used?*

For the customers it is observed that there is a need to decrease the proportion of capital expenditures (CAPEX) and increase the proportion of operational expenditures (OPEX) in IT.

To meet this need, and to (partially) finance the service provisioning, the city can use several pricing mechanisms. The (theoretical) manners are shown hereunder.

Category	Pricing Mechanism	Description
Fixed pricing	Pay per use	Customer pays in function of the time or quantity he consumes of a specific service.
	Subscription	Customer pays a flat fee in order to access the use of a product or to profit from a service.
	List price / menu price	A fixed price that is often found in a list or catalog.
Differential pricing	Service feature dependant	Price is set according to service configuration. Includes also bundling of different services.
	Customer charac-teristic dependant	Price is tailored to the characteristics of every single customer.
	Volume dependant	Differentiates prices on the basis of purchased volumes.
	Value-based	The final price will strongly depend on the customer's valua-tion of a value proposition.
Market pricing	Bargaining	The price outcome depends on the existing power relationships between the parties involved.
	Yield management	The best pricing policy for optimizing profits is calculated based on real-time modeling and forecasting of demand behav-ior.
	Auction	Price is set as buyers bid in increasing increments of price.
	Reverse auction	Price is set as sellers bid in decreasing decrements of price.
	Dynamic market	Price is the outcome of a large number of buyers and sellers that have indicated their price preference, but are not able to influence this price as individual sellers.

The decision for the pricing mechanism is up to the city's stakeholders, but a generic EPIC pricing mechanism is available:



The model suggests that a typical cloud service has three primary price components:

1. *First, there is a price for starting-up the service but it is charged only once. There may be also additional one-time charges if the service has some attributes that customer is able to change after the service is implemented and bring additional work to the services provider.*
2. *Second, there is an availability cost that incurs even if the customer does not use the service. For example, in case of an e-mail service, availability is the cost that incurs from having the mailbox and ability to send e-mail even if the user does not actually send any e-mail. The pricing mechanism for availability component is subscription, which means that the customer signs a contract for using the service for a certain period such as a month, etc.*
3. *The third price component is the actual operating cost of the service and it is the biggest element. The use of the cloud service is priced with a pay per use pricing mechanism. There is some predefined capacity unit to be measured and a customer pays in relation to his actual usage of capacity.*

Hence, the operating cost price component is variable whereas availability and start-up components are fixed. However, also the capacity units have a fixed unit price. It is possible that the unit price of capacity units is set according to customer commitment. For example, the price could be cheaper if the customer contracts to use the service for a longer period such as one year.

For sake of simplicity and clarity, it is suggested that the city/customers get only a single invoice that combines availability and operating cost. Though there should be also a breakdown of costs attached. It would be also beneficial to the customer to be able to follow the development of the operating cost in real-time via the EPIC administrative web portal, but this will only be possible when such admin unit is made readily available of course.

The benefit of such a pricing model is that it balances the commitment between the EPIC platform provider, the service provider(s) and the city/customer. This is because the customer's commitment is greater than compared to the raw pay per use pricing mechanism. The proposed pricing model is valuable from a service provider's viewpoint also because it has fixed-term subscription components that increases customer's lock-in and possibly stimulates closer relationship between customer and the service provider.

Although the proposed model may be suitable for most of the EPIC services, it is clear that formulating a generic pricing mechanism may be insufficient in some cases. Therefore, the proposed generic pricing mechanism might better serve as a basis for service-specific pricing mechanisms.

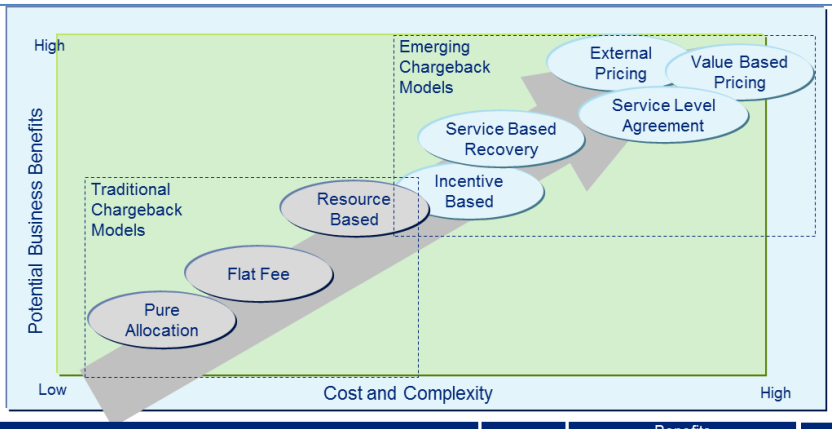
4. Chargeback

In order to have a clear understanding about the difference between the costs, pricing and chargeback a brief overview is included hereunder:

Concept	Objectives	Key mechanisms
Costing	Identification of the costs of products and services	- Cost identifications - Cost allocation
Pricing	Definition of a price for a given service or service level	- Pricing policy - Weighting factors
Chargeback	Invoice the client for the delivered services	- Allocation of costs to clients - Service consumption measurement - Chargeback granularity and units

In summary, pricing determines the price per unit of consumption and chargeback will define the practical way of working: to whom will I charge what in which manner?

There are several ways to organize the chargeback. The overview hereunder suggests some methods to organize chargeback, although not specifically adapted to Cloud Chargeback.



Chargeback Method	Description	Example	Benefits: Cost Awareness	Benefits: Cost Measurement	Benefits: Cost Management	Costs and Complexity
Pure Allocation	Costs allocated based on a driver not directly related to consumption (such as headcount, revenues, etc.)	None	3 ◑	1 ○	1 ○	Very Low
Flat Fee	Fixed annual cost negotiated with business unit; normally based on a "crude" estimate of consumption	Midrange	3 ◑	1 ○	3 ◑	Low
Resource Based	Cost allocated on consumption of specific resources (network, CPU, service hours, etc.)	CPU, ESM	5 ●	3 ◑	3 ◑	Low / Medium
Incentive Based	Costs designed to incent specific behavior (migration off legacy platforms, usage of new technologies, etc.)	Storage	5 ●	3 ◑	○	Low / Medium
Service Based Recovery	Costs are traced to business units based on consumption of specific activities and services	Output	5 ●	5 ●	5 ●	Medium
Service Level Agreement	Costs are traced to business units based on consumption of activities and services; quality and quantity of service are explicitly defined	Business Recovery	5 ●	5 ●	5 ●	Medium/High
External Pricing	Costs based on market (external) prices for consumption of activities and services	CPU	5 ●	5 ●	5 ●	High
Value Based Pricing	Costs based on perceived value delivered to customer (e.g. timely delivery of specific products, scarce resources, etc.)	None	5 ●	3 ◑	3 ◑	Very High

For cloud solutions, one of the key selling points is the fact that "you only pay what you use". Therefore it is essential that the chargeback system follows this idea and that it shows the direct link between consumption and price. In relation to the overview of chargeback models this idea is most met by the Service Level Agreement method of chargeback.

Annex IV: EPIC Service Level Agreement (SLA)

1. Ownership

This agreement is made between

……

and

……

…..

This SLA is owned by EPIC management and controlled by ……. All changes must be requested through EPIC Change Management.

Signatories:

Name…… Position (Business Service Owner) Date…….

Name……. Position (Service Level Manager). Date…….

Counter signatory:

Name……. Position (……). Date…….

Review Circulation:

Version No.	Date	Details of Changes included in Update	Author(s) - Reviewers

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3. Introduction

3.1 Scope

Note here any caveats concerning other agreements, for instance:
The service levels agreed herein must not exceed those stated in superior SLAs or supporting SLAs, Operational Level Agreements (OLAs) and Underpinning Contracts (UPCs).

3.2 Exclusions

Notes here about conflicting agreements and SM responsibilities therein…
If this is a supporting a priority judgement is made by the xxxx Business Owner against this Supporting SLA, the Service Level Manager will not be held accountable for any subsequent failure to reach Service Level targets.
If such an incident occurs, it will be looked at within the scope of the Service Improvement Plan to assess ways of avoiding possible future re-occurrence.

3.3 Purpose of SLA

This SLE describes the following attributes of the service, where appropriate and agreed:

- Description of the Service and the scope – what is covered and what is not
- Responsibilities of the service provider and customer
- Agreed Service Hours and Business Hours
- Availability Targets
- Reliability Targets
- Support hours and arrangements
- IT Service Continuity provision and service levels (referring to a separate Service Continuity SLA)
- Agreed volumes, transaction rates, resources, response times, batch turnaround times
- Agreed volume of change

- Charging (where appropriate)
- Performance incentives (where appropriate)
- Management Information
- Service Review and Reporting arrangements and procedures

4. Service Description

4.1 Purpose

4.1.1 Purpose of Business Service

State detailed purpose of the business service

4.2 Scope and attributes of the service

4.2.1 Security Classification

State security classification
Supporting services are listed below:

4.2.2 Service Component

List all component features and services.

4.2.3 Supporting Services & I.T. Systems

List all supporting services
Supporting I.T. Systems are listed below:

List supporting I.T. Systems – dependents

5. Business Functions

5.1 Key Business Requirements

5.1.1 Key Business Functions

State the hours that the key business functions are required and where they are required.

5.1.2 City/Regional Variations

Where key business functions differ from city to city or region to region, this should be stated here

5.2 Users & User Groups

5.2.1 Key Users & Groups

Details key users of the webservice and their locations

5.2.2 Changes to critical users, locations and times

Details any changes to critical users, locations or times since the last review

6. Responsibilities

6.1 Service Owner Responsibilities

6.1.1 Use of Service

- To ensure the Service is used as prescribed by the Service Level Manager and to advise on change in use or practice.

6.1.2 Information

To advise the Service Level Manager of any relevant information about the service or changes to the service in order to ensure accuracy:

- Organisation's Contacts: Helpdesks, Key Users and User Groups of the Service both regional and national
- Organisation's Information
- Organisation's changes which may have an effect on the service or necessitate a change to the Service Level Agreement
- To nominate an organisation's Out of Hours contact, or to give authority for the Service Level Management Out of Hours Manager (via Service Level Manager) to make decisions on behalf of the organisation
- To advise the Service Level Manager of the existence and location of organisation Continuity Plans relating to this Service

6.1.3 Reporting

- Where agreed Service Levels are not met, ensure this is immediately reported to the Service Level Manager
- To advise the Service Level Manager of perception of Service, and to encourage Organisation Helpdesks and Organisation Contacts to do the same.

6.1.4 Procedures

- To ensure the organisation adhere to the Change Management Procedures
- To be fully cognisant of Service Owner responsibilities within organisation Continuity and Security Plans

6.2 Service Level Manager Responsibilities

6.2.1 Information

- To advise the Service Owner of how the Service will be provided, and how the business need to use the Service
- To ensure all key business information is maintained as advised by the Service Owner
- To ensure all business functions are updated as advised by the Service Owner
- To ensure all key information about supporting services and I.T. systems is maintained.

6.2.2 Reporting

- To ensure the Service Owner is informed immediately if there are any changes in the Service Availability or Supported Hours
- To monitor and report on agreed Service Levels at intervals agreed between the Service Level Manager and the Service Owner
- Where Service Levels have failed to reach targets, to inform the Service Owner immediately, and to engage all relevant personnel in order to rectify the situation as soon as possible

- To advise the Service Owner of any changes in Change Management or other Service Management procedures that would require an amendment of Service Owner/Service Level Manager responsibilities
- To advise the Service Owner of the cost for running and supporting this service, where this can be established, and to advise of any subsequent increase or decrease
- To actively seek perception of Service Performance from Service Owner, Organisation Helpdesks, Organisation Contacts and Users
- To arrange Service Reviews and to ensure all interested parties are invited to attend

6.2.3 Procedures

- To negotiate higher levels of Service where required
- To establish working relationship with all Organisation Contacts for this Service
- To verify advised impact of service loss of key business functions.
- To be fully cognisant of Service Level Manager responsibilities within the IT Service Continuity plans
- To be fully cognisant of Service Level Manager responsibilities within Security Plans

7. Business Hours

7.1 Business Hours

7.1.1 Head Office Business Hours

State the Organisation's Business Hours for this Service

7.1.2 Regional/Branch Business Hours

Where these differ, state the Organisation's regional Business Hours

7.2 Business Peak Times

State Peak hours, times within month, year etc.

7.2.1.1 Regional Peak Times

Where these differ from the National, state regional peaks

7.3 Critical Business periods

List each critical period and dates together with a description of what is required

7.3.1 Month End

7.3.2 Year End

7.3.3 Business Year end

7.4 Business Support

7.5 In Business Hours

State the support provided or that the SLM is authorised to take decisions on behalf of the business out of hours

7.6 Out of Business Hours

State the support provided or that the SLM is authorised to take decisions on behalf of the business out of hours

8. Service Levels

8.1 Service Hours

8.1.1 Service Availability Hours

State days and hours it is possible to access the business service

8.1.2 Additional Service Hours

Describe agreed procedure for requesting additional or extraordinary support: this should be a standard process through service desk and the SLM

8.2 Specific Sub-services

List specific features and service levels and OLAs agreed, for instance, output distribution and delivery.

9. Support Hours and Arrangements

State days and agreed hours of support

9.1.1 On-Call Support

9.1.1.1 City-level On-Call

9.1.1.2 Regional level On-Call

9.1.2 On-Site Support

9.1.3 Third Party Support Hours

State days and agreed hours of support for each 3rd party supplier

9.2 Special conditions/exceptions

Detail agreed conditions/exceptions to support arrangements

9.3 Extensions to Support

Describe agreed procedure for requesting additional or extraordinary support: this should be a standard process through service desk and the SLM

9.4 Incident Response times

9.4.1 Internal Incident Response Times

9.4.1.1 A Priority Incidents

9.4.1.2 B Priority Incidents

9.4.1.3 C Priority Incidents

As appropriate

9.4.2 Other Internal Support Team Incident Response Times

The incident resolution time relates to the Application and does not include the Infrastructure

9.4.3 *Third Party Incident Response Times*

Name the 3rd Party

9.4.3.1 A Priority Incidents

9.4.3.2 B Priority Incidents

9.4.3.3 C Priority Incidents

As appropriate

9.4.4 Other Third Party Response Times

Specify any other Third Party response times

9.5 Escalation

Specify the escalation criteria and process in terms of incident priority and elapsed time before escalation and escalation route.

10. KPIs –Availability and Reliability

10.1 Key Performance Indicators and Target Availability and Service Levels

For instance

10.1.1 Response Times

10.1.2 Batch Completion

10.1.3 Online availability

10.1.4 Service Break Tolerance

10.1.4.1 Maximum Service Breaks

The maximum number of service breaks that can be tolerated within a (week/month/year) are?

10.1.4.2 Planned Outages

List Planned Outages for the agreed period. State how many may be expected over a reporting year.

10.2 Data Retention and Securities

10.2.1 Data Retention and archive

Describe the strategy for archiving data:

- *Organisation data – customers, transactions etc*
- *System data and code*

10.2.2 Securities

Element	***Frequency***	***Retention***
System		
Database		
Code		
Organisation data		

10.3 Variations

Describe any variations from the above for specific business or maintenance reason. Describe periods where availability is critical or more important than others.

11. Service Capacity

11.1 Baseline Capacities and thresholds

Infrastructure Element	Baseline	Threshold	Growth +1 year
Disc			
MIPS			
Database			
Throughput			
Print & despatch			
Network			
SW licences			

12. Service Continuity

This should refer to SLAs and OLAs with suppliers of ITSC services, but summarise here

12.1 Recovery Method

12.2 Scope of recovery

12.3 Recovery lead time

12.4 Invocation

12.4.1 Authority

12.4.2 Criteria

12.4.3 Procedure

13. Service Change Levels

State the volume of change the service and requests for additional information that may be made

13.1 SLM Funded Changes

The number of SLM funded changes that can be made to this service throughout the year is limited to nnnn.

13.2 SLM funded Ad Hoc Reports

The number of SLM funded ad-hoc reports Service Level Management will provide for this service throughout the year is limited to nnnn.

14. Charges

14.1 Charging

For instance

The annual cost for running and supporting this service is:

- Gb. Usage €
- MIPS €
- Output Handling €
- Software licence cost €
- Maintenance contract costs €
- Support staff resource costs €
- Software costs €

- Annual amendment fixed costs €
- Other (please specify) €

15. Performance Incentives and Penalties

List the incentives and penalties, related to KPIs of course, but also things like the Service Improvement Program, if applicable.

15.1 Deliverables

List all business deliverables the service will provide, including prints or other outputs

15.2 Impact Of Service Loss

Percentage loss tolerance and agreed service levels for key business functions under the following headings –
Legal
Government/Ministerial
Public Visibility
Revenue Loss
Departmental Staff
State whether impact of service loss is High, Medium or Low in each case. To be set by the Service Owner. Where this is dependent on time of day/month/year this should also be stated

15.3 Known Changes

The following are known changes required that will impact upon this SLA

Change Ref	**Nature of change**	**Impact**

16. Service Reporting and Reviewing

16.1 Service Reviews

State the frequency of Service Reviews, location, mandatory and optional attendees.

16.2 Service Report

State the lead-time for delivery of the Service Report and its circulation.
State what method of reporting is used. State number of report types currently available. State proposed requirements with advice on limit

16.3 Review Personnel

- Service Owner
- Service Level Manager
- Operational Business Manager(s)
- Change Manager
- Problem Manager
- Configuration Manager
- Release Manager

- Representative from Technical Services
- Representative from 3rd party supplier
- Regional Service Level Manager
- I.T. Service Continuity Manager

16.4 Management Information

State the management information required.

17. Service Report and Contents

The Service Report forms the basis of the service review and whilst some detail is required it should be at a level appropriate to the intended outcomes of the Review. Most of the report should be at summary level and should mirror the aspects of the SLA that are measurable.

17.1 Management Summary

A summary of the major features of the reporting period describing briefly incidents, service levels, improvements and service issues.

17.2 Performance Against Measured Attributes

17.2.1 Performance against KPIs

17.2.2 Performance against other Measurables

17.2.3 Overall Traffic Light Service Performance Indication

17.3 Non-Measured Performance

This is a description of any problems, incidents and achievements that happened or were made during the reporting period. The sections in here depend on what is in the SLA and what is of interest, for instance a particular aspect of the service is under scrutiny

17.4 Service Improvement Plan

A table of planned service improvements comprising identification, a very brief description, status, the expected delivery date, resource allocated and any other information of interest:

Description	Progress and status	Actions and Issues	Delivery Date	Responsibility

17.5 Report on Service and Support Area Performance

Specific areas, for instance, Service Desk or Operations, are reported on according to criteria agreed

17.5.1 Breakdown of Incidents

A summary, for example

Service Functional Area	Priority 1 Incidents	Priority 2 Incidents	Priority 3 Incidents

17.5.2 Incidents in Detail

17.6 A table of incidents comprising, for example:

Date & Time	Description	Resolution	Actions	Responsibility	Delivery Date

17.7 Capacity and Availability

17.7.1 Service Breaks and Extensions

Report here details such breaks

17.7.1.1 Unplanned Breaks

Date	Reason for break in service	Resolution	Agreed Duration of break	Actual duration of break

17.7.2 Service Extensions

Date	Reason for extension	Duration

17.7.3 Future Planned Extensions

Date	Reason for extension	Duration

17.7.4 Utilisation

17.7.4.1 Summary

As necessary – use of resources against plan, contract, SLA, for example:

Infrastructure Element	Design/Contract baseline	Utilisation this reporting period	Predicted Growth + 1 year
Gb			
MIPS			
Database			
Print & Dispatch			
Network			
SW licenses			

17.7.4.2 Specific

Here the report will highlight specific elements that are required to be reported in detail as a result of the SLA or actions from previous reviews. For example where the utilisations or growth rates exceed threshold values, or issues resulting from incidents.

17.8 Change Control

A summary of changes applied to the system. The detail required might be great or Service Management all depending on the purpose. At least a summary is required.

17.8.1 Releases

List or describe the releases implemented

17.8.2 Emergency Changes

List or describe the emergency changes implemented.

18. Glossary

- **Service Owner** The person responsible for decision making with regard to the Business Service
- **Service Level Manager** The person responsible for ensuring that Service Levels for the EPIC Service are met
- **Service** A business defined deliverable supported by one or more I.T. Systems, which enables the business to deliver its objectives
- **System** An EPIC deliverable comprised of varying hardware and software, which enables a Service to run
- **Key Business Functions** The vital functions of the business, without which there would be no point in having a Service
- **Key Users** Usually chief organisation contacts and administrators; people who use the service and I.T. systems regularly and directly interface with the public or other internal users (e.g. in the case of the HQ Services)
- **Key User Groups** Based on importance of location to the business. The area(s) that above all others generate most revenue or are most fraud-sensitive or need to perform at highest requirements or have the most external users etc.

19. Amendment Sheet

Author	Reviewers	Signatories

Annex V: EPIC Intellectual Property Agreement

EPIC WEBSERVICE AGREEMENT

This WebService Agreement (the "Agreement") is effective [DATE].

BETWEEN: EPIC (the " Platform"), a company organized and existing under the laws of [COUNTRY], with its head office located at:

[YOUR COMPLETE ADDRESS]

AND: [COMPANY NAME] (the "Webservice Provider"), an individual or company organized and existing under the laws of [COUNTRY], with its head office located at:

[COMPLETE ADDRESS]

WHEREAS, [COMPANY NAME], (the “Webservice Provider” hereinafter) is in the business of providing certain software and computer consulting services pertaining to [SPECIFY]; and

WHEREAS, EPIC, (the “ Platform”, hereinafter) wishes to retain the services of Webservice Provider to:

1. locate, establish, install and maintain computer software to provide the EPIC Platform with a system to provide information via the World Wide Web protocol of the Internet (the "World Wide Web"), and allow Internet users to make transactions (via the "EPIC Platform");

2. assist EPIC with Platform's development and operation of a content platform to make EPIC-related information accessible via the World Wide Web to City users (the Platform's presence on the World Wide Web under this Agreement by the EPIC Platform and the Platform Server referred to herein as the "Platform");

3. promote the EPIC Platform;

4. develop and improve computer programs and other deliverables to be used in connection with the EPIC Platform; and

5. consult with the EPIC Platform provider with respect to the ultimate transfer of all hardware and software components of the EPIC Platform;

WHEREAS, Webservice Provider wishes to provide the EPIC Platform with such services;

NOW, THEREFORE, in consideration of the conditions and covenants set forth hereinafter, it is agreed as follows:

1. RETENTION

EPIC Platform hereby retains Webservice Provider effective as of the date first set forth above (the "Effective Date") and Webservice Provider hereby accepts retention by the EPIC Platform.

2. CONSULTANT WEBSERVICES

Upon the terms and subject to the conditions contained herein, Webservice Provider agrees to provide to EPIC Platform consulting services as described in statements of work to be agreed to in writing between the parties during the term hereof (the "Statements of Work") and which shall be consecutively numbered

and annexed hereto as Schedule [SPECIFY]. Such services shall be provided in accordance with the provisions of this Agreement and the applicable Statement of Work.

3. ADDITIONAL SERVICES

In addition to the services described in this agreement, Webservice Provider shall perform the following additional services in accordance with the timetable set forth as Schedule [SPECIFY] (the "Timetable"):

3.1 Training

Provide such training (not to exceed [NUMBER] days), advice and information concerning the use and features of the Webservice provided to the EPIC Platform and its users. Any additional training will be compensated pursuant to Schedule [SPECIFY], attached.

3.2 Internet Protocol Address and Corresponding Domain Name

Obtain, at the request of the EPIC Platform, on EPIC Platform's behalf and in EPIC Platform's name, an Internet Protocol address and corresponding "(sub)domain name" chosen by the EPIC Platform, and do all other acts necessary to establish the address of the EPIC Platform. All right, title and interest in the domain shall vest exclusively in the EPIC Platform. Webservice Provider shall have no liability whatsoever in connection with or arising out of the domain name which is obtained for EPIC Platform. Webservice Provider's use of the domain name shall be governed by Section [NUMBER] herein. Other than the Initial Fee, Webservice Provider's services under this section shall be at no cost to EPIC Platform.

3.3 Configuration and Operation of the EPIC Platform

Webservice Provider shall consult with the EPIC Platform provider with respect to the hardware and software leases, licences, maintenance agreements and operating agreements to be obtained on behalf of EPIC Platform to implement the webservice. Webservice Provider shall pay all costs and fees in connection with such agreements during the term of this Agreement until the EPIC Platform is relocated to the EPIC Platform's premises pursuant to Section [NUMBER] herein. Without limitation of the foregoing, to the extent that any third party software licences are required to be obtained by Webservice Provider to perform its obligations hereunder, Webservice Provider shall obtain such licences on the EPIC Platform's behalf at no additional cost. Other than the Initial Fee, Webservice Provider's services under this section shall be at no cost to the EPIC Platform.

3.4 Access to Telecommunications Software and/or Hardware

Webservice Provider shall advise and consult with EPIC Platform with respect to EPIC Platform's procurement of telecommunications services for the client Server to be located at EPIC Platform's (or a location designated by the SmartCity's ICT premises). Webservice Provider shall have no liability with respect to performance by any third-party telecommunications service provider except that Webservice Provider shall require confirmation of the number of possible simultaneous users and speed of transmission. Webservice Provider's services under this section shall be at no cost other than the Initial Fee.

3.5 Proper EPIC Format

Provide consulting services to the EPIC Platform and translate Webservice-supplied text, graphics and other materials into the proper format for use on the EPIC Platform (such materials, as periodically updated by the EPIC Platform as part of the EPIC Platform's offering to Smart Cities, shall be known as the "EPIC Web Content"). Additional obligations of the parties with respect to the development of the EPIC Web Content are further set forth below in Section [NUMBER]. Other than the Initial Fee, Webservice Provider's services with respect to the development of the EPIC Web Content under this section shall be at no cost to EPIC Platform.

3.6 EPIC Platform Related Programs and Other Deliverables

Develop, in accordance with Section [NUMBER] herein, the EPIC Platform Related Programs and other Deliverables (as defined herein).

3.7 EPIC Platform Related Software Development

Copy, reformat, improve, review or advise on the EPIC platform related software developed by the Webservice provider, as requested by and as set forth in any Statement of Work. Webservice Provider will not be separately compensated by EPIC for such services since the Webservice will become an integral part of the offering to the SmartCity in question.

3.8 Software Scripting Routines

In accordance with the Timetable, develop software scripting routines in [SPECIFY] which will generate HTML to make the EPIC Platform's Service catalog information appear on the EPIC Platform as specified herein (the catalog, together with the software routines and underlying database is referred to herein as (the "Service Catalog") and install, configure and customize the EPIC Platform to enable and track purchases from the Service Catalog. Other than the Initial Fee, Webservice Provider's services with respect to the Service Catalog under this section shall be at no cost to the EPIC Platform. Webservice Provider shall be compensated for the development of any updates (as opposed to bug fixes or error corrections which are addressed in Section [NUMBER] herein) to the Service Catalog after EPIC Platform's Provider acceptance of the initial version of the Service Catalog pursuant to Schedule [SPECIFY], attached.

3.9 Transmission of Information

Cooperate with the EPIC Platform to make available the ability to transmit information from the EPIC Platform to the EPIC Platform Provider. Webservice Provider shall provide the EPIC Platform Provider, at no additional cost, with consulting ad advice on obtaining software which will provide the EPIC Platform Provider with the capability to receive encrypted Email communications of all User Information, at the EPIC Platform Provider's facility, in the most efficient manner. the EPIC Platform Provider will bear the cost of obtaining such software. Upon establishment of encrypted E-Mail access, Webservice Provider shall transmit accurately and completely no less than once daily (Monday through Friday, excluding national holidays) the User Information received at the the EPIC Platform Provider. With consultant from Webservice Provider, the EPIC Platform Provider shall be responsible for obtaining and installing the appropriate software at the EPIC Platform Provider's location for receiving transmission of the User Information.

3.10 Recording

Manage the recording/logging of all information made available from people accessing the EPIC Platform, or purchasing items from the Service Catalog, including, without limitation name, address, credit card numbers, products requested and any other information directly or indirectly obtained from such users (collectively, "User Information"). The Webservice Provider will be compensated for such services pursuant to Schedule [SPECIFY], attached.

3.11 EPIC Platform Promotion

Provide assistance as requested by the EPIC Platform Provider in promoting the EPIC Platform through press releases and messages to City/Government newsgroups, selected World Wide Web sites or selected other sites. Webservice Provider will not place any such promotional material without written approval by the EPIC Platform Provider in each instance as set forth in Section [NUMBER] herein. Other than the foregoing, Webservice Provider shall not be obligated to provide commercial advertising services to the EPIC Platform Provider under this Agreement. Webservice Provider shall not promote the EPIC Platform Provider by either random or broadcast use of the Internet. Other than the Initial Fee, consultant's services under this section shall be at no cost to the EPIC Platform Provider. Webservice Provider will have no liability for the inaccuracy of any material used for promotional purposes and provided by the EPIC Platform Provider, provided that Webservice Provider does not alter, modify or

change in any way such materials as provided by the EPIC Platform Provider, and provided further that Webservice Provider use such materials in strict compliance with the directions provided by the EPIC Platform Provider.

4. EPIC PLATFORM (DISPLAY) DEVELOPMENT

Webservice Provider shall develop the EPIC Webservice Content for use on the EPIC Platform. Upon the provision by the EPIC Platform Provider to contents such as text, graphics or other information (collectively, "Content") for use in the EPIC Platform, Webservice Provider shall promptly adapt, translate and reformat the Content as necessary into the proper EPIC format. Webservice Provider shall make no changes to the text or appearance of any graphics in the Content without the prior written approval of the EPIC Platform Provider. The EPIC Platform Provider shall make the final determination of all Content to be used on the EPIC Platform. All photographs, trademarks, images or other works owned or controlled by the EPIC Platform Provider and which are specified by the EPIC Platform Provider for inclusion in the EPIC Platform shall be provided by the EPIC Platform Provider in clear and camera ready form necessary for digital translation, or in other format agreed upon by the parties. The completed version of the EPIC Platform shall be provided to the EPIC Platform Provider for acceptance in accordance with the Timetable set forth in Schedule [SPECIFY].

5. STATEMENTS OF WORK

5.1 The EPIC Platform Provider Related Programs

As used in this Agreement, the term "the EPIC Platform Provider Related Programs" shall mean the software deliverables (other than the EPIC Web Content) to be produced by Webservice Provider hereunder.

5.2 Milestone Schedule

As used in this Agreement, the term "Milestone Schedule" shall mean the schedule for the development ofthe EPIC Platform Provider Related Programs as set forth as part of the relevant Statement of Work.

5.3 Information the EPIC Platform Provider Must Supply

To implement a Statement of Work, the EPIC Platform Provider shall supply to Webservice Provider the Specifications, Milestone Schedule, pricing and payment terms (including an estimate of required hours or a fixed price proposal) and any other information that Webservice Provider may reasonable require to evaluate the performance of the services desired by the EPIC Platform Provider (the "Proposal"). Within [NUMBER] business days of Webservice Provider's receipt of the Proposal, Webservice Provider shall respond, either accepting the Proposal as a Statement of Work, or requiring changes thereto. All work hereunder, other than fixed-price proposals, shall be compensated pursuant to Schedule [SPECIFY], attached. The parties shall negotiate in good faith with respect to the Proposal, until both parties agree to implement the Proposal, as it may be mutually revised in writing, as a Statement of Work. Webservice Provider shall not be required to commence work until both parties have agreed in writing to the Statement of Work. The performance of the services required in the Statement of Work shall be completed in accordance with the time frame set forth in the Statement of Work, provided the EPIC Platform Provider shall have delivered all necessary information and materials in a timely fashion, and if not, then Webservice Provider's obligations which are dependent on such information or materials shall be extended to reflect such delay.

5.4 Specifications

As used in this Agreement, the term "Specifications" shall mean the requirements for the development of athe EPIC Platform Provider Related Program or other Deliverable, including operational and functional capabilities and performance, all as set forth as part of the relevant Statement of Work.

6. DELIVERY AND DELIVERABLES

As used in this Agreement, the term "Deliverable" shall mean any product produced by Webservice Provider hereunder in connection with the EPIC Web Content or any Statement of Work.

6.1 Time and Manner of Delivery

Webservice Provider shall deliver each Deliverable at the times and in the manner specified therefore under this Agreement, including any relevant Statement of Work. Notwithstanding the foregoing, if the EPIC Platform Provider fails to provide Webservice Provider the information or responses required under the acceptance test procedure set forth herein within the applicable time period, then Webservice Provider's obligations which are dependent on such information or approval shall be extended to reflect such delay.

6.2 Procedure of Acceptance

The procedure for acceptance of any Deliverable shall be as follows:
 the EPIC Platform Provider shall have [NUMBER] days to inspect and test each such Deliverable when received to determine if it conforms to the Specifications.

 if any Deliverables fails to conform to its Specifications, the EPIC Platform Provider shall give Webservice Provider written notice of the failure stating the defect in the Deliverables. Webservice Provider shall then have [NUMBER] days to remedy such failure and redeliver such failure and redeliver such Deliverable to the EPIC Platform Provider. After resubmission, the EPIC Platform Provider shall again inspect the Deliverable to confirm that it conforms to the Specifications. If the resubmitted Deliverable again fails the EPIC Platform Provider's acceptance testing, the EPIC Platform Provider may, in its sole discretion (a) deem the failure to be a material breach under this Agreement; or (b) accept the Deliverable as a non-conforming Deliverable.

Each Deliverable shall be deemed to be accepted upon written notice by the EPIC Platform Provider to Webservice Provider of such acceptance. the EPIC Platform Provider will not unreasonably withhold or delay acceptance.
Except in instances of Force Majeure or in case of an extension pursuant to Sections [SPECIFY] herein, a failure by Webservice Provider to provide Deliverables to the EPIC Platform Provider within the agreed upon time period shall be a material breach under this Agreement.

7. NO SOLICITATION OF EMPLOYMENT

During the term of this Agreement, the EPIC Platform Provider shall not solicit for employment any of Webservice Provider's then-current employees without Webservice Provider's prior written consent.

8. CONFIDENTIALITY

8.1 Confidential Information

Except to the extent required by law, the parties hereto agree that no disclosure or public announcement with respect to this Agreement or the transactions herein contemplated shall be made by any Party hereto without the prior written consent of the other Party.

8.2 Confidentiality of User Information

Without limitation of the foregoing, Webservice Provider acknowledges and agrees that the User Information shall be deemed to be Confidential Information of the EPIC Platform Provider, and that Webservice Provider not use User Information for any purpose other than that of fulfilling Webservice Provider's obligations under this Agreement. Neither consultant nor any third party on behalf of consultant, shall have the right, directly or indirectly, to use, exploit, disclose, transmit, sell, assign, lease or otherwise convey or make available for access by third parties, any User Information.

9. ACKNOWLEDGMENT AS EPIC WEBSERVICE PROVIDER

The EPIC Platform Provider shall acknowledge Webservice Provider as the webservices developer of the EPIC Platform in text in an "acknowledge page" of the EPIC Web Content, which will include a hyperlink to Webservice Provider's site on the World Wide Web. The format of such development credit shall be at the sole discretion of the EPIC Platform Provider. It shall be the sole responsibility of Webservice Provider to provide the EPIC Platform Provider with sufficient information to create and update such hyperlink. Such development credit will remain on the EPIC Platform Provider for until [NUMBER] years from the Initial Display Date (as defined herein) or the termination of this Agreement, whether or not thethe EPIC Platform Provider is transferred in-house to facilities at the premises of the EPIC Platform Provider. Such development credit shall not give Webservice Provider any trademark, copyright or other proprietary interest or rights in the EPIC Web Content. Nothing herein shall be construed to require the EPIC Platform Provider to promote thethe EPIC Platform Provider and the level of effort and spending in promotion of thethe EPIC Platform Provider, if any, shall be in the EPIC Platform Provider's sole discretion.

10. INTELLECTUAL PROPERTY

10.1 Webservice Provider Materials

All techniques, algorithms and methods or rights thereto owned by Webservice Provider at the time of this Agreement is executed and employed by Webservice Provider in connection with thethe EPIC Platform Provider Related Programs (Webservice Provider Materials) shall be and remain the property of Webservice Provider unless they are in the public domain. Webservice Provider grants to the EPIC Platform Provider a perpetual, irrevocable, royalty free, unrestricted right to use, modify, transfer and maintain the Webservice Provider Materials.

10.2 Property of the EPIC Platform Provider

Nothing herein shall be construed to grant any right or licence to Webservice Provider or to any Content or other material provided to Webservice Provider hereunder by the EPIC Platform Provider, other than the right to use such material solely on behalf of the EPIC Platform Provider in accordance with the terms hereto. All of the foregoing materials, including without limitation any and all copyrights, trademarks or trade names, are and shall remain the property of the EPIC Platform Provider.

10.3 Ownership

Unless otherwise specified in a Statement of Work, and except for the Webservice Provider proprietary Materials, all Deliverables and other materials, products, modifications developed or prepared for the EPIC Platform Provider by Webservice Provider under this Agreement (including any Statement of Work) including without limitation program images and text viewable on the Internet, any HTML Code relating thereto, or any program code created at the request of the EPIC Platform Provider, is the property of the EPIC Platform Provider and all title and interest therein shall vest in the EPIC Platform Provider and shall be deemed to be a "work made for hire" and made in the course of the services rendered hereunder. The extent that title to any such works may not, by operation of law, vest in the EPIC Platform Provider or such works may be considered works made for hire, all right, title and interest therein are hereby irrevocably assigned to the EPIC Platform Provider. All such materials shall belong exclusively to the EPIC Platform Provider with the EPIC Platform Provider having the right to obtain and to hold in its own name, copyrights, registrations or such other protection as may be appropriate to the subject matter, and any extensions and renewals thereof. Webservice Provider agrees to give the EPIC Platform Provider and any person designated by the EPIC Platform Provider, any reasonable assistance required to perfect the rights defined in this Section.

11. WARRANTIES

11.1 Webservice Provider Warranties

Webservice Provider represents and warrants that:

- all of the services to be performed by it hereunder will be rendered using sound, professional practices and in a competent and professional manner by knowledgeable, trained and qualified personnel;
- Webservice Provider is the owner of or otherwise has the right to use and distribute all materials and methodologies used in connection with providing the Deliverables;
- the Deliverables are and will be free of any software disabling devices or internal controls, including, without limitation, time bombs, viruses, or devices of similar nature;
- the Deliverables will operate in conformance with the relevant terms of this Agreement, including without limitation, the Statements of Work;
- Webservice Provider will comply with all applicable federal, state and local lows in the performance of its obligations hereunder,
- all Deliverables hereunder will be compatible and operate in conjunction with all software and hardware previously delivered under this Agreement; and
- the Deliverables (other than information or materials supplied by the EPIC Platform Provider and reproduced accurately in the Deliverables) shall not infringe upon any third party copyright, patent, trade secret or other proprietary right;
- the EPIC Platform shall be maintained and kept up-to-date to utilize current developments in Internet-related technology within a reasonable time after such technology becomes generally commercially available.

11.2 the EPIC Platform Provider Warranties

The EPIC Platform Provider represents and warrants that:

- the use, as contemplated by this Agreement, of the material supplied by the EPIC Platform Provider hereunder shall not infringe any copyright, trademark, trade secret or other third party proprietary right; and
- there is no impediment to the EPIC Platform Provider's performance of its obligations hereunder.

11.3 Webservice Provider Warranties

Webservice Provider makes the representations and warranties regarding uptime, response time, and service responses as set forth in Schedule [SPECIFY] hereto.

12. INDEMNIFICATION

12.1 Webservice Provider Indemnification

Webservice Provider agrees to indemnify and hold harmless the EPIC Platform Provider, its directors, officers, employees and agents, and defend any action brought against same with respect to any claim, demand, cause of action, debt or liability, including reasonable attorney's fees, to the extent that it is based upon a claim that:
if true, would constitute a breach of any of Webservice Provider's representations, warranties, or agreements hereunder,

- arises out of the negligence or willful misconduct of Webservice Provider; or
- any of the consultant Materials, Deliverables or services to be provided by consultant hereunder infringes or violates any patents, copyrights, trade secrets, licences, or other property rights of any third party.

12.2 the EPIC Platform Provider Indemnification

The EPIC Platform Provider agrees to indemnify and hold harmless Webservice Provider, its directors, officers, employees and agents, and defend any action brought against same with respect to any claim, demand, cause of action, debt or liability, including reasonable attorneys' fees, to the extent that it is based upon a claim that:

if true, would constitute a breach of any of the EPIC Platform Provider's representations, warranties, or agreements hereunder;

- arises out of the negligence or wilful misconduct of the EPIC Platform Provider; or
- any of the Content provided by the EPIC Platform Provider hereunder and used by Webservice Provider as contemplated in this Agreement infringes or violates any patents, copyrights, trade secrets, licences, or other property rights of any third party

12.3 Notice of Claim

In claiming any indemnification hereunder, the indemnified party shall promptly provide the indemnifying party with written notice of any claim which the indemnified party believes falls within the scope of the foregoing paragraphs. The indemnified party may, at its own expense, assist in the defence if it so chooses, provided that the indemnifying party shall control such defence and all negotiations relative to the settlement of any such claim and further provided that any settlement intended to bind the indemnified party shall not be final without the indemnified party's written consent, which shall not be unreasonably withheld.

12.4 Survival of Indemnification Obligation

Each party's indemnification obligations shall survive any termination of this Agreement.

13. MAINTENANCE AND SUPPORT

During the term of this Agreement, Webservice Provider agrees that at no extra cost to the EPIC Platform Provider:

a) to the extent that any Deliverable or service provided by Webservice Provider shall fail to fulfil any warranty therefor, Webservice Provider shall, upon written notice by the EPIC Platform Provider of such failure, use its best efforts to promptly remedy such failure; and

b) Webservice Provider shall, upon written notice by the EPIC Platform Provider of such failure, use its best efforts to promptly deliver to the EPIC Platform Provider all software containing bug fixes or error corrections to any software or other Deliverable provided hereunder to the EPIC Platform Provider, including without limitation the EPIC Web Content, the Service Catalog andthe EPIC Platform Provider Related program, at no additional cost to the EPIC Platform Provider. In connection with such maintenance, the EPIC Platform Provider shall provide Webservice Provider with such information as Webservice Provider reasonably requires in a reasonable time to allow Webservice Provider to provide such maintenance. Webservice Provider shall be party to standard third party hardware and software maintenance agreements related to thethe EPIC Platform Provider. Webservice Provider shall have no responsibility for the maintenance of any third party software or hardware, other than as provided for herein or pursuant to any agreement entered into by Webservice Provider pursuant to the terms of this Agreement.

14. LIMITATION OF LIABILITY

It is furthermost understood and agreed that with the exception for the indemnification obligations set forth herein, neither party hereto will not be liable for lost profits, lost opportunities, or indirect, incidental or consequential damages under any circumstances.
Except for the indemnification obligations set forth herein, Webservice Provider's liability to the EPIC Platform Provider for any and all other matters related to this Agreement shall not exceed the total amount paid by the SmartCity to Webservice Provider hereunder. Except for the indemnification obligations set forth herein, the SmartCity's liability to Webservice Provider for any and all matters related to this Agreement shall not exceed the total of payments due to Webservice Provider from the SmartCity hereunder.

THE LEGAL WARRANTIES WHICH ARE OF PUBLIC ORDER UNDER THE LAWS OF [COUNTRY] AND THE REMEDIES THEREFOR ARE THE SOLE AND EXCLUSIVE WARRANTIES AND REMEDIES FOR WHICH [SPECIFY] IS LIABLE AND ARE IN LIEU OF ALL OTHER WARRANTIES (WHETHER WRITTEN OR ORAL, EXPRESSED OR IMPLIED) INCLUDING, BUT NOT LIMITED TO, ANY WARRANTY OF MERCHANTABILITY AND WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, AND [SPECIFY] SHALL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES, OR DAMAGES OF ANY KIND BASED UPON ANY CLAIM FOR BREACH OF WARRANTY, OTHER THAN AS STATED ABOVE.

15. COMPENSATION

15.1 Initial Display Date

As used herein, "Initial Display Date" shall mean the date upon which the EPIC Platform Provider's EPIC Web Content (and therefore the acclaimed Webservices from the Service Catalogue) can be accessed by users of the Internet in accordance with the terms and conditions of this Agreement. The "Service Catalog Display Date" shall mean the date upon which the Service Catalog may be accessed, and purchases may be made from the Service Catalog, by users of the Internet in accordance with the terms and conditions of this Agreement.

15.2 Fees

The EPIC Platform Provider shall pay Webservice Provider an initial fee in accordance with the amount and payment schedule as set forth in Schedule [SPECIFY] based on the Sales Agreement with the SmartCity. For the services to be rendered by Webservice Provider to the EPIC Platform Provider or the SmartCity hereunder, the EPIC Platform Provider shall pay to Webservice Provider the agreed upon fees, in accordance with Schedule [SPECIFY], attached.
For the services provided by Webservice Provider to the EPIC Platform Provider indicated in Section [NUMBER] (including monthly service fees, credit card transaction fees, catalog request fees, and processing fees), the EPIC Platform Provider shall compensate Webservice Provider, in accordance with Schedule [SPECIFY], attached.

15.3 Non-Exclusivity

Nothing herein shall be construed to preclude the EPIC Platform Provider from distributing mail-order catalogs, selling any merchandise (whether or not appearing in the Service Catalog), or selling the EPIC Platform Provider Memberships.

16. TERM

This Agreement shall commence as of the Effective Date and shall continue until the earlier of (a) [NUMBER] years after the Service Catalog Display Date; or (b) prior termination according to the terms hereof (the Term).

17. TERMINATION OF AGREEMENT

17.1 Webservice Provider Termination

Webservice Provider may terminate this Agreement:

a. upon filing of any voluntary petition by the EPIC Platform Provider or upon the filing of any involuntary petition against the EPIC Platform Provider under the Bankruptcy Code that is not dismissed within [NUMBER] days after filing, or upon any appointment of a receiver for all or any portion of the EPIC Platform Provider's business or operations, or any assignments of all or substantially all the assets of the EPIC Platform Provider for the benefit of creditors; or
b. upon the EPIC Platform Provider's material breach of this Agreement, if client fails to cure such default within [NUMBER] days after receipt of notice specifying the default in reasonable detail; or pursuant to the terms of Section [NUMBER]

17.2 The EPIC Platform Provider Termination

The EPIC Platform Provider may terminate this Agreement:
i) upon filing of any voluntary petition by Webservice Provider or upon the filing of any involuntary petition against Webservice Provider under the Bankruptcy Code that is not dismissed within [NUMBER] days after filing, or upon any appointment of a receiver for all or any portion of Webservice Provider's business or operations, or any assignment of all or substantially all the assets of Webservice Provider for the benefit of creditors;

ii) upon Webservice Provider's material breach of this Agreement, if Webservice Provider fails to cure such default within [NUMBER] days after receipt of notice specifying the default in reasonable detail;

iii) upon the EPIC Platform Provider's written request to terminate thethe EPIC Platform Provider, which shall be given no less than [NUMBER] days prior to the effective date of such termination; or

iv) pursuant to the terms of Section [NUMBER]

17.3 Rights After Termination

In the event of a termination of this Agreement:
v) the provisions of Sections [NUMBER] shall survive the termination of this Agreement;

vi) each party shall return all copies of Confidential Information and all other property belonging to and/or received from the other party. Webservice Provider agrees that upon the termination of this Agreement for any reason, or at any time during the Term as requested by the EPIC Platform Provider, Webservice Provider shall return (or, at the EPIC Platform Provider's request, destroy) all records of User Information in the possession or control of Webservice Provider; and

vii) except as otherwise stated herein, each party may pursue claims it has against the other for any breach of the terms of this Agreement.

18. USE IN ADVERTISING

Webservice Provider agrees that it will not, without the written consent of the EPIC Platform Provider in each instance:

- use in advertising, publicity or otherwise (including without limitation on the Internet) the name of the EPIC Platform Provider, the EPIC Platform Provider's domain name, any trademark, trade name, symbol or any abbreviation or contraction thereof owned by or referring to the EPIC Platform Provider; or

- represent, directly or indirectly, that any product or service offered by Webservice Provider has been approved by or endorsed by the EPIC Platform Provider.

19. TRANSITION

19.1 The EPIC Platform Provider Options

Upon the termination of this Agreement for any reason, or at any time during the term of this Agreement later than [NUMBER] months from the Effective Date, the EPIC Platform Provider shall have the option of transitioning either the [SPECIFY] Version or the [SPECIFY] Version of thethe EPIC Platform Provider to the EPIC Platform Provider's premises (the "Transition") upon written notification to Webservice Provider. Within [NUMBER] days of the EPIC Platform Provider's written notification to Webservice Provider of the exercise of such an option, Webservice Provider shall:

- deliver to the EPIC Platform Provider and install upon the EPIC Platform Provider's hardware the source code, object code, documentation and any other software or materials related to the [SPECIFY] Version or [SPECIFY] Version of thethe EPIC Platform Provider;
- take all other steps necessary to promptly transfer all ongoing rights and obligations under any third party agreements relating to thethe EPIC Platform Provider (including without limitation, software licence and maintenance agreements) to the EPIC Platform Provider; and
- perform up to [NUMBER] hours of transition assistance services identified in Schedule [SPECIFY] hereto over a period not to exceed [NUMBER] days from the EPIC Platform Provider's exercise of the option at no extra cost to the EPIC Platform Provider. Without limitation of the foregoing, upon the EPIC Platform Provider's written notification of the exercise of this option, Webservice Provider shall be deemed to have:
    - granted to the EPIC Platform Provider a right (revocable only in the case of the EPIC Platform Provider's breach of Section [NUMBER] herein) to use, copy, and maintain all Webservice Provider owned or controlledthe EPIC Platform Provider software (including source code, object code and documentation) (the "Transition Deliverables") for the [SPECIFY] Version and [SPECIFY] Version; and
    - conveyed to the EPIC Platform Provider all of Webservice Provider's right, title and interest to third party software which Webservice Provider used or incorporated into thethe EPIC Platform Provider.

19.2 Acceptance of Transition

The EPIC Platform Provider shall have [NUMBER] business days to accept the [SPECIFY] Version or the [SPECIFY] Version as transitioned to the EPIC Platform Provider. the EPIC Platform Provider shall have all acceptance rights set forth herein with respect to the transitioned software.

19.3 Acceptance Fee

Upon the EPIC Platform Provider's acceptance of the transitioned software (i.e. the [SPECIFY] Version or [SPECIFY] Version as the case may be), the EPIC Platform Provider shall pay to Webservice Provider the agreed upon acceptance fee as set forth in Schedule [SPECIFY], attached, and any fees due for consulting services rendered by Webservice Provider.

20. GENERAL PROVISIONS

20.1 Force Majeure; Disaster Recovery

Each party shall be released from and shall have no liability for any failure beyond its reasonable control, including, but not limited to, acts of God, labor troubles, strikes, lockouts, severe weather, delay or default of utilities or communications companies or accidents.

20.2 Waiver

No modification of or amendment to this Agreement shall be valid or binding unless set forth in writing and duly executed by both parties and no waiver of any breach of any term or provision of this Agreement shall be effective or binding unless made in writing and signed by the Party purporting to give the same and, unless otherwise provided, shall be limited to the specific breach waived. No failure on the part of either Party to exercise, and no delay in exercising, any right under this Agreement shall operate as a waiver of such right. No single or partial exercise of any such right shall preclude any other or further exercise of any such right or the exercise of any other right.

20.3 Partial invalidity

Should any provision of this Agreement be held to be void, invalid or inoperative, the remaining provisions of this Agreement shall not be affected and shall continue in effect and the invalid provision shall be deemed modified to the least degree necessary to remedy such invalidity.

20.4 Independent Contractor

Webservice Provider is acting, in performance of this Agreement, as an independent contractor. Webservice Provider shall provide under this Agreement the services of only those personnel who are employees of Webservice Provider for federal tax purposes. Webservice Provider shall be solely responsible for the payment of compensation of personnel assigned to perform services hereunder. the EPIC Platform Provider shall not be responsible for payment of worker's compensation, disability benefits and unemployment insurance or for withholding or paying employment related taxes for any Webservice Provider employee, but such responsibility shall be solely that of Webservice Provider. In the event that any federal, state or local government agency, any court or any other applicable entity determines that the personnel provided by Webservice Provider or any permitted subcontractor or assignee of Webservice Provider hereunder are employees of the EPIC Platform Provider for any purpose, Webservice Provider agrees to indemnify and hold the EPIC Platform Provider harmless from all liabilities, costs and expenses (including, but not limited to, attorneys' fees) associates with such determination. Notwithstanding any other provision of this Agreement, Webservice Provider may assign or subcontract work to be performed hereunder with the express written consent of the EPIC Platform Provider, and Webservice Provider shall remain primarily liable for all obligations hereunder.

20.5 Source Code Escrow Agreement

- Webservice Provider agrees to negotiate in good faith and enter into a Source Code Escrow Agreement (SCEA) with the EPIC Platform Provider and a third party escrow agent (Escrow Agent). Webservice Provider will provide Escrow Agent with a copy of the source code of thethe EPIC Platform Provider software (the Unix Version and the NT Version as it is developed) and documentation therefor (the Deposit), to be held in escrow pursuant to the terms and conditions of the SCEA. The SCEA will provide that the Deposit will be released to the EPIC Platform Provider;

- upon Webservice Provider making an assignment for the benefit of its creditors,

- upon the filing under any voluntary bankruptcy or insolvency law, the reorganisation of Webservice Provider's assets or the appointment of a trustee or receiver for Webservice Provider property; or

- upon the material breach of this Agreement relating to services to be provided by Webservice Provider to the EPIC Platform Provider, unless within [NUMBER] days of written notice from the EPIC Platform Provider, Webservice Provider has remedied the breach. the EPIC Platform Provider will be responsible for the Escrow Agent's fees. The Deposit shall be updated by Webservice Provider no less than quarterly with the current version of the source code and documentation for the [SPECIFY] Version and the [SPECIFY] Version, and shall be updated whenever Webservice Provider changes the source code in productive use on behalf of the EPIC Platform Provider.

20.6 Insurance

Webservice Provider shall purchase and keep in force at its own cost and expense the minimum coverages with such insurers as set forth in "Insurance Coverage", Schedule [SPECIFY], attached, including:

- Worker's Compensation and Employees Liability Insurance;

- Commercial General Liability Insurance, including Contractual Liability, completed operations, personal injury coverage, broad form property damage;

- Errors and Omission Insurance; and

- Umbrella coverage for (b) and (c) above. Minimum coverage amounts are set forth in Schedule E, attached. Each and every policy and certificate shall contain an endorsement stating that the

insurance company will not, prior to the expiration or termination of this Agreement or any policy expiration date shown on the policy and certificate, terminate the policy or change any coverage therein without giving written notice to the EPIC Platform Provider. This notice shall be provided by certified mail to the EPIC Platform Provider and shall arrive at least [NUMBER] days prior to the termination or change.

20.7 Notices

Any demand, notice or other communication to be given in connection with this Agreement shall be given in writing and shall be given by personal delivery, by registered mail or by electronic means of communication addressed to the recipient as follows:

If to the EPIC Platform Provider:

EPIC
[YOUR COMPLETE ADDRESS]
Attention: [INDIVIDUAL NAME]
Fax: [YOUR FAX NUMBER]

If to Webservice Provider:

[COMPANY NAME]
[COMPLETE ADDRESS]
Attention: [INDIVIDUAL NAME]
Fax: [FAX NUMBER]

or to such other address, individual or electronic communication number as may be designated by notice given by either Party to the other. Any demand, notice or other communication given by personal delivery shall be conclusively deemed to have been given on the day of actual delivery thereof and, if given by registered mail, on the third Business Day following the deposit thereof in the mail and, if given by electronic communication, on the day of transmittal thereof if given during the normal business hours of the recipient and on the Business Day during which such normal business hours next occur if not given during such hours on any day. If the Party giving any demand, notice or other communication knows or ought reasonably to know of any difficulties with the postal system which might affect the delivery of mail, any such demand, notice or other communication shall not be mailed but shall be given by personal delivery or by electronic communication.

20.8 Assignment

This Agreement and all rights, duties and obligations arising hereunder may not be assigned by either Party without the prior written consent of the other Party.

20.9 Entire Agreement

This Agreement constitutes the entire agreement between the parties with respect to the subject matter hereof and cancels and supersedes any prior understandings and agreements between the Parties with respect thereto. There are no other representations, warranties, terms, conditions, undertakings or collateral agreements, express, implied or statutory, between the parties other than as expressly set forth in this Agreement.

20.10 Governing Law

This Agreement shall be governed by and construed in accordance with the laws of [COUNTRY].

20.11 Arbitration

In the event of any dispute or difference arising between the parties in connection with this Agreement, the parties shall use their best efforts to settle the dispute amicably and by mutual agreement. If the parties

are unable to resolve the dispute by mutual agreement, any party may notify the other party that it wishes to commence arbitration proceedings under the provisions of this Agreement.

Any arbitration shall be settled by arbitration in accordance with the Arbitration Rules of [OFFICIAL ARBITRATION BODY OF COUNTRY/STATE/PROVINCE].

The parties grant a special and irrevocable power of attorney to the [ARBITRATION BODY], so that upon a written request of any one of them the [ARBITRATION BODY] may appoint an arbitrator from among the members of the arbitration body. A decision and an award of the arbitrator will be final. The parties expressly waive all legal recourse in respect of a decision of the arbitrator. The arbitrator is specially empowered to resolve all matters related with his competence and/or jurisdiction.

IN WITNESS WHEREOF, the parties have executed and delivered this Agreement as of the date first above written.

EPIC PLATFORM PROVIDER	WEBSERVICE PROVIDER
Authorized Signature	Authorized Signature
Print Name and Title	Print Name and Title