# ASCIMER

ASSESSING SMART CITY INITIATIVES FOR THE MEDITERRANEAN REGION

# ASSESSMENT METHODOLOGY
# FOR SMART CITY PROJECTS

## Application to the Mediterranean Region

**European Investment Bank · Institute**

**POLITÉCNICA**

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# 1. INTRODUCTION

With the development of new technological innovations - mainly ICTs, **the concept of the "Smart City"** emerges as a means to achieve more efficient and sustainable cities. Cities are becoming smart not only in terms of automated daily functions, but rather in ways that enable us to monitor, understand, analyze and plan the city to improve urban performances in real time. The emphasis on social and environmental capital distinguishes Smart Cities from a pure technology-centric concept, thus enhancing a multi-dimensional point of view regarding cities. To be really Smart, urban areas need to manage their development by supporting economic competitiveness, enhancing social cohesion, environmental sustainability and ensuring an increased quality of life for their citizens.

Today, over one half of the world´s population lives in urban areas, the **Mediterranean territory** is highly urbanized, looking at the fact that more than half of its population lives in cities: 74% of the population in Europe, and 63% of the population in the Middle-East and Northern African countries, and this number is growing. In this context, Smart City solutions become an opportunity to address the Urban Challenges of the region, tightly linked to the cultural, political, social and territorial frameworks of every city, and hence to their regional contexts particularities. The definitions of a Smart City support the concept of being a multi-stakeholder, municipally based issue. Thus, governance issues become a priority, allowing different stakeholders to collaborate in Smart City developments in the region.

Nowadays, there is a lack of standardized metrics and methodologies to assess, prioritize, finance, implement, manage and replicate Smart City Projects in specific regions or contexts.

**ASCIMER** (Assessing Smart City Initiatives for the Mediterranean Region) is a 3-years research project supported by the European Investment Bank under the EIB University Research Sponsorship Programme (EIBURS) and developed by the Universidad Politécnica of Madrid (UPM).

The overall goal of this research program is to develop a comprehensive framework to help public and private stakeholders to make informed decisions about Smart City investment strategies and to build skills to evaluate and prioritize these kinds of projects, including solving difficulties regarding deployment and transferability. The project will address the following objectives:

1. To define the Smart City concept and to understand how it can contribute to achieve urban development priorities.

2. To develop a methodology to assess and prioritize Smart City projects.

3. To develop guidelines to implement and manage Smart City Projects.

4. To characterize Mediterranean City Challenges and to develop a transferability strategy of Smart City projects. This objective will be part of the other three above.

*Figure 1: ASCIMER Project overview.*

The first steps of the project had to do with the description of the concept of a Smart City as well as the development of a Best Practices Guide, which is information tool for cities that want to take advantage of the ICTs and solve their challenges through Smart City Projects. This step of the project has had a special focus on the description of the challenges in the Mediterranean Region.

**ASCIMER project has developed and assessment tool** in order to evaluate these kind of projects facing them to the real **challenges of the city**. This tool has been developed as a general tool, being applicable to any project in any city, adapting the methodology according to its challenges.

However, to choose the right project is not enough for achieving its success. Smart City Projects development is a long process in which **governance issues** become the key for achieving the objectives. Extracting guidelines for the development of Smart City Projects understanding the role of stakeholders in each of the phases is key.

This is a brief summary of what has been the development of the ASCIMER project. The detailed description of each of the stages will appear throughout the following document.

## 2. SMART CITY CONCEPT

### 2.1. DEFINITION

The definition of a Smart City is a very broad concept that has technology as a basic aspect, coupled with social and human capital development. There is no agreement between the experts when it comes to give a definition of what a Smart City is (Fig. 2), so ASCIMER has developed its own working definition that serves as a basis to the development of the assessment methodology:

> **ASCIMER's Smart City Working definition**
> "A Smart City is an integrated system in which human and social capital interact, using technology-based solutions. It aims to efficiently achieve sustainable and resilient development and a high quality of life addressing urban challenges on the basis of a multistakeholder, municipality based partnership."

This definition stablishes a strong basis for the city and the objetives cities must achieve, defining the tools and main actors involved in the Smart City concept. These are the three main goals that a Smart City pursues:

1. <u>Improve the efficiency of the city as a system</u>

   Smart City initiatives seek the efficiency of the existing and new infrastructure through:

   - Interconnecting the different infrastructure components, services offered and people working with them.
   - Reducing the costs in the long term, thanks to the monitoring and information sharing.

2. <u>Achieve a sustainable & resilience development.</u>

   Although linked with efficiency, sustainability has a broader scope. The consensual definition of sustainable development is a "development that meets the needs of the present without compromising the ability of future generations to meet their own needs".

   Resilience adds to that sustainable development the capability of recovering fast and of minimising harm after an unexpected event or disaster takes place in the city.

3. <u>Increase the quality of life of its citizens.</u>

   Increasing the quality of life of its citizens constitutes a key objective of the Smart City. When working with the city there should never be forgotten that the final end of the city itself are its inhabitants. Whenever a Smart City initiative is developed, its ultimate target ought to be to improve the quality of life of the citizens.
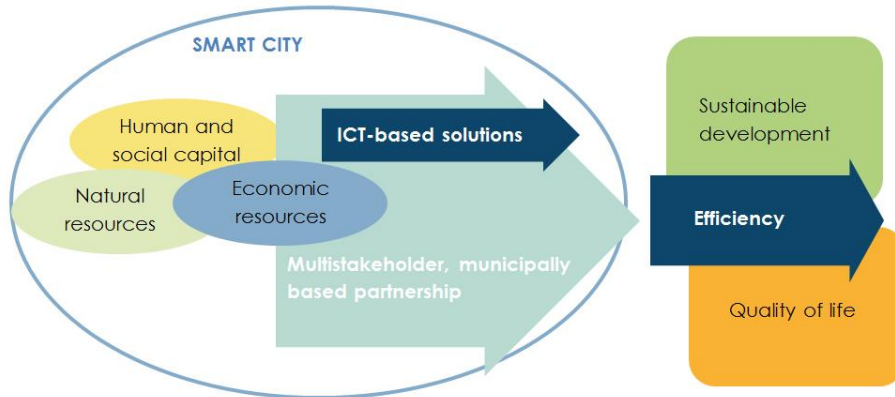
*Figure 2: Smart City concept*

## 2.2. DIMENSIONS

Analyzing the urban environment, research works deal with a different number of fields to frame the city. We have identified in the reviewed literature that they can all be allocated within six main City Dimensions: Governance, Economy, Mobility, Environment, People and Living.

They represent the specific aspects of a city upon which Smart Initiatives impact to achieve the expected goals of a Smart City strategy (sustainability, efficiency and high quality of life). Technology itself it is not considered an action field, but an enabler that improves the efficiency of the projects.

A project is smarter when it integrates the higher number of dimensions. The approach should be as integrated and holistic as possible (Fig.3).
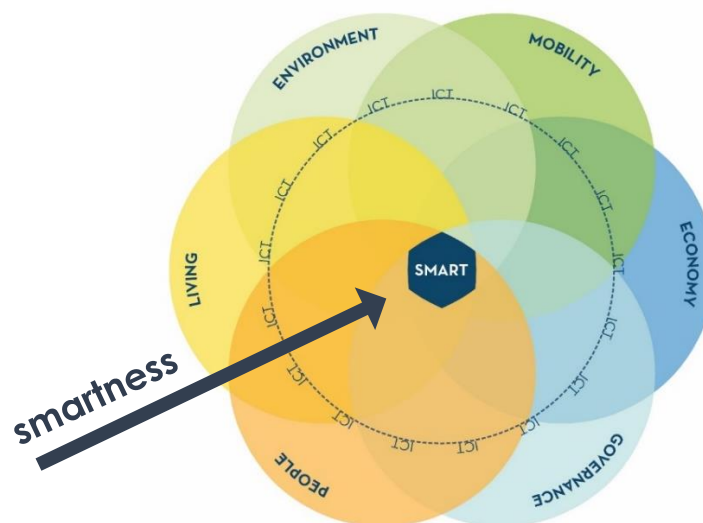


*Figure 3: Smart City dimensions*

## SMART GOVERNANCE

Smart Government makes use of available technology to be aware of -and coordinate with- the activities carried out by other municipalities, achieve synergies through collaborations with other stakeholders and reach out citizens needs in order to improve both, public services, and confidence in the public institutions.

## SMART ECONOMY

An urban economy is considered to be a Smart Economy when the sector gathers innovation and productivity to adapt to the market and workers' needs to enhance new business models and a resilient global model for competing both locally and globally.

## SMART MOBILITY

Smart Mobility pursues to offer the most efficient, clean and equitable transport network for people, goods and data. It leverages the available technologies to gather and provide information to users, planners and transport managers, allowing the reshaping of urban mobility patterns, of planning mechanisms and the enhancement of multimodality by improving the coordination and integration of different transportation modes.

## SMART ENVIRONMENT

Smart Environment uses data collection from utility networks, users, and air , water, and other city resources in order to establish main areas of action in urban planning and city infrastructure planning as well as to inform urban services managers to achieve a more efficient and sustainable urban environment while improving the citizens' quality of life.

## SMART PEOPLE

A Smart City needs the citizen to participate in order for the incoming initiatives to succeed. The existence of citizens able to participate wisely in smart urban life and to adapt to new solutions providing creative solutions, innovation and diversity to their communities is needed. Education appears as the main tool to improve this dimension, as well as initiatives to retain creative profiles.

## SMART LIVING

As a conclusion, Smart Living is considered the wise management of facilities, public spaces and services using ICT technologies to put focus on improving accessibility, on flexibility of uses, and on getting closer to the citizens´ needs.

## 3. SMART CITY PROJECTS

### 3.1. SMART CITY PROJECT'S CHARACTERISTICS

A Smart City Project (SCP) is a project that generates a change and produces an impact towards a Smart City. However, the Smart City definition should include technology in a wider sense, and not only ICTs (e.g. new materials). SCPs should be tools which make cities more comfortable to live in and able to maintain complexity, multiply interactions, recognize diversity and manage uncertainty. All of these factors are inherent characteristics of urban dynamics and constitute the attractiveness of cities and their current intelligence.

The ASCIMER Assessment methodology aims to evaluate Smart City Projects understanding their impacts in the city and their contribution to reach a Smart City. Each of the following key elements should be inherently part of a SCP and constitute one of the basis taken as a departure point in the development of the ASCIMER methodology, as explained throughout this document:
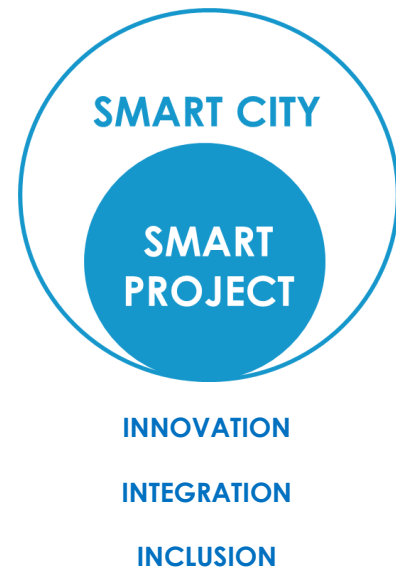
**SMART CITY**

**SMART PROJECT**

**INNOVATION**

**INTEGRATION**

**INCLUSION**

*Figure 4: Smart city projects characteristics*

**INNOVATION**

SCPs should promote environments of technological cooperation (platforms) for the development of new solutions to old urban problems. One key element, as established by several definitions and as it is reflected in ASCIMER's working definition is the use of technology -in its broader sense- in the project, it has to be addressed at solving one or more city challenges improving the efficiency, sustainability or quality of life of the city. Technology offers the opportunity to address urban problems in an innovative way.

**INTEGRATION**

Initiatives should be crosscutting among vertical areas of governance, combining knowledge, capacities and competences horizontally towards the objectives defined by the sustainability framework. A SCP should help with the creation of interconnected systems in which flows of materials, energy and information are managed coherently. A SCP should also improve dialogue between institutional representatives and citizens and it should increase the horizontal relationship inside the municipality and the interchange with other institutional and civil society entities.

**INCLUSION**

On one hand, some participants think that SCPs should always be connected with people, and citizens need to recognize them and be able to design them. On another hand, others

believe that there are two kinds of projects: ones that engage people and others where people are passive agents, not necessarily aware of the project´s scope. In the latter, it is necessary to explain the benefits of the projects to citizens, considering that transparency and openness are core element for smart city initiatives.

## 3.2. TAXONOMY

Once that the concept of Smart City is defined, a systematic approach to the possibilities of action of the Smart City projects has been developed.

The Smart City concept has changed from the execution of specific projects to the implementation of global strategies to tackle city challenges. Thus, it is necessary to get a comprehensive overview of the possibilities and to relate them to the city challenges. As a common point to all of them, the key factor of the Smart City projects has been identified to be the use of ICT.

According to these criteria, project actions have been defined as seen in table 1.

| Smart Governance | | Smart Environment | |
|---|---|---|---|
| | Participation | | Network and environmental monitoring |
| | Transparency and information accessibility | | Energy efficiency |
| | | | Urban planning and urban refurbishment |
| | Public and Social Services | | Smart buildings and building renovation |
| | Multi-level governance | | Resources management |
| | | | Environmental protection |
| E Smart Economy | Innovation | Smart People | Digital education |
| | Entrepreneurship | | Creativity |
| | Local & Global interconnectedness | | ICT - Enabled working |
| | Productivity | | Community building and urban life management |
| | Flexibility of labor market | | Inclusive society |
| Smart Mobility | Traffic management | Smart Living | Tourism |
| | Public Transport | | Culture and leisure |
| | ICT Infrastructure | | Healthcare |
| | Logistics | | Security |
| | Accessibility | | Technology accessibility |
| | Clean, non-motorised options | | Welfare & Social inclusion |
| | Multimodality | | Public spaces management |

*Table 1: Smart City Project Actions*

Some of these project actions could be developed as a unique project, but others are more general and define the basis for action with several Smart City projects.

Through the development of the ASCIMER approach, the need of reaching a deeper level in the Smart City possible actions has been detected. Inside any of the identified project actions there are several possibilities of development, and they are frequently interwoven. Research about the different possible project actions has showed different groups of Smart Projects that configure the Smart City actions. Projects have been grouped in the different dimensions. Smart City strategies comprehend a combination of these subactions.

Developing this deeper level reduces the gap between theory and practice, providing an approach to real projects as well as to innovative possibilities that are still in project phase or are being developed by different entities (from private companies to grassroots organizations) but present a strong potential to be included in multi-stakeholder, municipally based Smart City Strategies. The aim of this second phase is to widen the panel of possibilities and to present an approach that is closer to implementation.

| SMART MOBILITY PROJECT SUB-ACTIONS | | |
|---|---|---|
| Smart Mobility | SMo1. Traffic management | SMo1.1.Strategic corridor and network management |
| | | SMo1.2.Incident management |
| | | SMo1.3.Safety enhancement |
| | | SMo1.4.Real time traveller information |
| | | SMo1.5.Traffic restriction (specially private vehicles) |
| | | SMo1.6.Parking management systems |
| | SMo2. Public Transport | SMo2.1.Real time traveller information |
| | | SMo2.2.Real time operator information |
| | | SMo2.3.Safety and security enhancement. |
| | | SMo2.4. Public transport alternatives. |
| | | SMo2.5. Integrated payment systems |
| | SMo3. ICT Infrastructure | SMo3.1. Systems for collection of data (monitoring and positioning systems) |
| | | SMo3.2. Systems and protocols for communicating data |
| | | SMo3.3. Systems and procedures to ensure quality of the data |
| | | SMo3.4. Payment systems&Ticketing |
| | SMo4. Logistics | SMo4.1. Improvement on the trackability&traceability of goods |
| | | SMo4.2. Fleet tracking&management |
| | | SMo4.3. Stock management |
| | | SMo4.4. Last-mile solutions |
| | SMo5. Accesibility | SMo5.1. Enhancing physical accessibility |
| | | SMo5.2. Enhancing digital accessibility |
| | | SMo5.3. Enhancing socio-economical accessibility |
| | | SMo5.4. Enhancing cultural accessibility |
| | SMo6. Clean or non-motorised options | SMo6.1. Clean energy in traffic and parking. |
| | | SMo6.2. Cycling options. |
| | | SMo6.3. Walking options. |
| | | SMo6.4.Alternative motorized options (car sharing, car pooling, van sharing) |
| | SMo7. Multimodality | SMo7.1.Passenger multimodality |
| | | SMo7.2.Freight multimodality |

| SMART GOVERNANCE PROJECT SUB-ACTIONS | |
|---|---|
| | SGo.1.1. Complaints and suggestions |
| SGo1. Participation and inclussion | SGo.1.2. Participation in decision making |
| | SGo.1.3. Collaborative production of services |
| | SGo.1.4. Bottom up processes coordinated by municipality |
| SGo2. Transparency and information accessibility | SGo2.1. Open data. |
| | SGo2.2. Governmental transparency |
| | SG2.3. Tools for representation and access to information |
| SG3. Public and Social Services | SGo3. 1. Online public and social services. |
| | SGo3. 2. Integration and interconnection of services. |
| | SGo3. 3. Public entities in social networks. |
| SGo4. Multi-level governance | SGo4. 1. Integration and interconnectedness of different governmental levels |
| SGo5. Efficiency in municipal management | SGo5.1. Efficiency in management, regulations and instruments. |
| | SGo5.2. Efficiency in the provision of services |

Smart Governance

| SMART ECONOMY PROJECT SUB-ACTIONS | |
|---|---|
| | SEc1.1. Policies and plans for enhancing innovation. |
| SEc1.Innovation | SEc1.2. Measures to foster cooperation between administration, businesses and education. |
| | SEc1.3. Infrastructure for innovation. |
| | SEc1.4. Services for innovation. |
| | SEc1.5. New business based on innovation |
| SEc2. Entrepreneurship | SEc2.1.Entrepreneurial education and training. |
| | SEc2.2.Creation of entrepreneurial environments and infrastructures. |
| | SEc2.3. Entrepreneurial support policies and actions |
| SEc3. Local & Global interconnectedness | SEc3.1.City internationalization. |
| | SEc3.2. Bussiness and commerce networks. |
| | SEc3.3. Presence of bussinness in the internet. |
| | SEc3.4. Globalization risks management. |
| SEc4. Productivity | SEc4.1. Physical and technological infrastructure to enhance productivity. |
| | SEc4.2. Management for adaptation |
| SEc5. Flexibility of labour market | SEc5.1.Meassures to improve accesibility to labour market. |
| | SEc5.2. Meassures to combat unnemployment. |
| | SEc5.3. Development of technological improvements that enhance flexibility |

Smart Economy

| SMART PEOPLE PROJECT SUB-ACTIONS | | |
|---|---|---|
| | SPe1. Digital education and long-life learning | SPe1.1.Technology and learning methods. |
| | | SPe1. 2. Skills for technology. |
| | | SPe1. 3.Local facilities for long-life learning |
| | SPe2. Creativity | SPe2.1. measures for fostering creative artists and individuals. |
| | | SPe2.2. Creative networks. |
| | | SPe2.3. Partnerships including creative entities. |
| Smart People | SPe3. ICT - Enabled working | SPe3.1. Measures and platforms for employment. |
| | | SPe3.2. Home-based work ans workplace flexibilization. |
| | | SPe3.3. Timetable flexibilization. |
| | SPe4. Community building and urban life management | SPe4.1. ICT-enabled bottom up initiatives. |
| | | SPe4.2. Community based organizations networking and platforms. |
| | | SPe4.3. Community and urban life information spread and sharing |
| | | SPe4.4. Community centres and facilities |
| | SPe5. Inclusive society | SPe5.1. Human rights watch. |
| | | SPe5.2. Inclusion policies and measures: cultural pluralism, gender, pro-poor measures. |
| | | SPe5.3. Civil society (civil rights, civic responsibility, civic engagement, citizenship and mutual trust). |

| SMART ENVIRONMENT PROJECT SUB-ACTIONS | | |
|---|---|---|
| | SEn1. Network and environmental monitoring | SEn1.1. Environmental monitoring (Natural resources, ecosystem, biodiversity) |
| | | SEn1.2. Disaster risk monitoring |
| | | SEn1.3. Network monitoring. |
| | | SEn1.4. Real time information and visualization tools |
| | SEn2. Energy efficiency | SEn2.1. Smart grids. |
| | | SEn2.2. Renewable energy. |
| | | SEn2.3. Energy efficiency in buildings. |
| | | SEn2.4. Energy efficiency in public devices. |
| | | SEn2.5. District energy supply options. |
| | | SEn2.6. Citizen involvement in energy efficiency meassures. |
| | SEn3. Urban planning and urban refurbishment | SEn3.1. Urban planning in new developments. |
| Smart Environment | | SEn3.2. Urban Refurbishment. |
| | | SEn3.3. Urban management related to planning. |
| | | SEn3.4. Participation in urban management and planning |
| | SEn4. Smart buildings and building renovation | SEn4.1. Sustainability in new buildings. |
| | | SEn4.2. Sustainability in building renovation. |
| | | SEn4.3. Policies and systems that involve people in energy consumption and sustainability of buildings. |
| | SEn5. Resources management | SEn5.1. Waste management. |
| | | SEn5.2. Water management. |
| | | SEn5.3. Food management. |
| | | SEn5.4. Consumption patterns. |
| | SEn6. Environmental protection | SEn6.1. Natural resources protection. |
| | | SEn6.2. Ecosystems protection. |
| | | SEn6.3. Biodiversity proteccion. |
| | SEn7. Awareness rising and behavioural change | SEn7.1.Tools for behavioural change |
| | | SEn7.2.Awarenes rising tools |
| | | SEn7.3Involvement in sustainable measures in buildings and urban spaces |

| SMART LIVING PROJECT SUB-ACTIONS | | |
|---|---|---|
| Smart Living | SLi1. Tourism | SLi1.1. Tourism information via Internet. |
| | | SLi1.2. Tourism accomodation facilities. |
| | | SLi1.3. On-line tickets or tourist card. |
| | | SLi1.4. Integration of tourism with cultural and other kind of activities in the city |
| | | SLi1.5. Measures to prevent and reduce negative impacts of tourism |
| | SLi2. Culture and leisure | SLi2.1. Culture information via Internet. |
| | | SLi2.2. On-line tickets, reservations and inscriptions. |
| | | SLi2.3. Cultural heritage management. |
| | | SLi2.4. Participation in municipal cultural program |
| | SLi3. Healthcare | SLi3. 1. Disease prevention. |
| | | SLi3. 2. Promoting healthier lifestyle and well-being. |
| | | SLi3. 3. Improve access to healthcare. |
| | | SLi3. 4. Health information and education. |
| | SLi4. Security | SLi4. 1. Urban security. |
| | | SLi4. 2. Security services online. |
| | | SLi4. 3. Digital security |
| | SLi5. Technology accesibility | SLi5.1. Technologies to enable accessibility to people with disabilities. |
| | | SLi5.2. Accessibility meassures for people with functional limitations |
| | | SLi5.3. Measures to overcome technological barriers and maximize compatibility. |
| | | SLi5.4. Measures to solve environmental factors. |
| | | SLi5.5.Measures to solve cultural and income limitations |
| | | SLi5.6. Urban labs and SC centres |
| | SLi6. Welfare & Social inclusion | SLi6.1. Improving accessibility to labour market, specific actions for long term unemployment. |
| | | SLi6.2. Measures for gender inclusion and women support. |
| | | SLi6.3. Services for inmigrants. |
| | | SLi6.4. Interconnection with other services, ONG's, etc. |
| | | SLi6.5. Online volunteering or volunteering aid via internet. |
| | | SLi6.6. Family and children aid |
| | SLi7. Public spaces management | SLi7.1. Integration and connection of uses in public space. |
| | | SLi7.2. Adaptation of public space to users. |
| | | SLi7.3. Public spaces management |

## 4. SMART CITY PROJECTS' ASSESSMENT METHODOLOGY

Smart City Projects´ objectives and Cities' objectives exist at different levels, but we have seen that a tight coherence between the two is necessary. Therefore, the ASCIMER methodology for Smart City Projects aims to reflect this unity amongst the various levels, but also to evaluate the level of compatibility between different (and conflicting) dimensions.

In the framework of ASCIMER project, through the expert consultation process, the following elements have been agreed to be part of the assessment process:

- Impact on employment
- Effect on resource distribution
- Inclusiveness
- Participation
- Fulfillment of the basic needs
- Adequacy to people´s needs
- Environmental improvement
- Climate Change
- Production of negative externalities
- Cultural impact
- Efficiency (money, energy, time, space, non-renewable resources, etc.)
- Quality of services
- Financial sustainability
- Transferability level (It has been pointed out that "replicability" is often an illusion)
- Maturity of the country (stability, risks, leadership)
- Leadership and managerial capability
- Innovation
- Level of integration with global objectives

To arrange all these concepts, the elements for evaluating a Smart City Project can be –on a theoretical level- assimilated to those of any project, which, for organizational purposes for the methodology, can be thought as follows:

The general structure of the ASCIMER methodology is formed by five different blocks as shown in figure 5. Each block synthesizes the assessment of a different set of criteria selected in order to comply with the global assessment objectives taken from EIB's mission and ASCIMER project findings. The order of the blocks has been set taking into account both the logic development of the process and the usability for EIB evaluators.
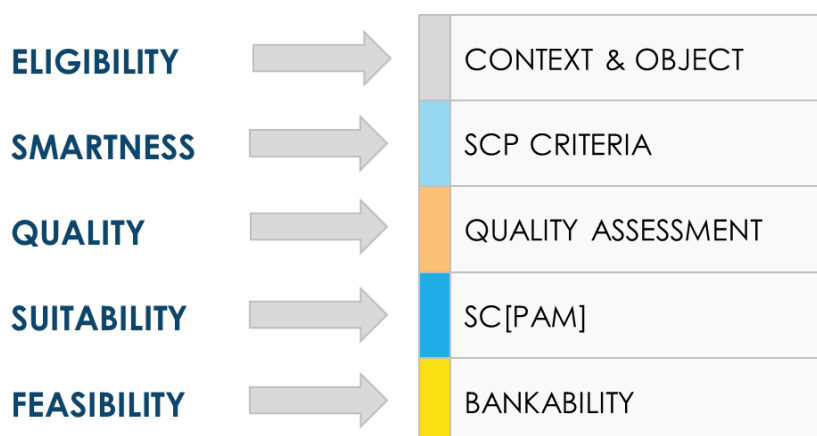


*Figure 5: Conceptual Structure of the Assessment tool*

The concept of eligibility here refers to the capacity to have or do something because you have the right qualifications. In project assessment, it refers to the match between the projects´ characteristics and the minimum requirements demanded by –in this case- the financing institution and more concretely by the specific call where the project takes part. The goal of this conceptual block is to bring together all the basic information related to the description of the city structure and characteristics, as well as that of the city context in terms of territorial background, infrastructures and institutions, and the project´s characterization itself. This information is also used for deeper examination in future evaluation steps. These items meant to characterize the different elements to be considered are grouped under the designation **CONTEXT AND OBJECT** in both the document and the presentation.

**SMARTNESS -> SCPCRITERIA**
The calls for which the ASCIMER methodology is intended are related to Smart City Projects, therefore the **SMARTNESS** of the initiative is be reviewed in this section. This section aims to evaluate the accomplishment of the specific characteristics that are necessary for a project to be considered Smart. Therefore, this section is called **SCP CRITERIA** Smart City Project Criteria).

**QUALITY -> QUALITY ASSESSMENT**
The concept of quality here refers to the standards considered when comparing similar elements; how positive or negative they are. ASCIMER project previous work established a set of objectives for the Smart City. The level of fulfillment of the objectives defined is reviewed in this section. The designation chosen for quality criteria along the methodology is **QUALITY ASSESSMENT**.

**SUITABILITY -> SC [PAM]**

Suitability in general demonstrates how appropriate a particular occasion is. In the project evaluation context, it refers to the coherence between the project's objectives and the needs for its execution. In this case it aims to verify the alignment with those of the citizen of a given city, region or area within the city where the project is intended to be implemented.

Suitability criteria along the methodology is synthesized in the SMART CITY PROJECT ASSESSMENT MATRIX (**SC[PAM]**).

**FEASIBILITY -> BANKABILITY**

The concept of Bankability here aims to capture the characteristics of the project being possible and likely to be achieved. It holds technical criteria on the capabilities of the municipality in terms of means and financial resources in order to evaluate the possibilities of the project to be financed by the bank.

The information evaluated in the different blocks is used either to discard the project or to allow its access to the next step. The exception to this is the "Quality Assessment" block, of which the results are evaluated faced to the Urban Challenges in the SC[PAM]. The process takes place as follows:
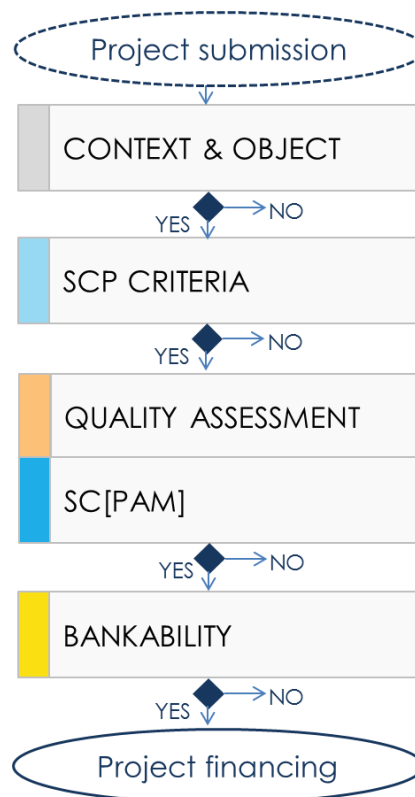


*Figure 6: Use of the methodology in the assessment process*

## APPLICATION FORM/TOOL

It is worth mentioning that all these areas defined by the ASCIMER methodological framework are assessed via a single set of questions that is presented in a coherently structured way to the applicant municipalities and the EIB evaluators. In each case, either qualitative or quantitative information is collected and evaluated. As reflected in chapter "3.3.1. Project Quality." Each question and answer provides different values for parameters that are used as indicators for the final evaluation of the Smart City Project as a whole (see Table 3.)
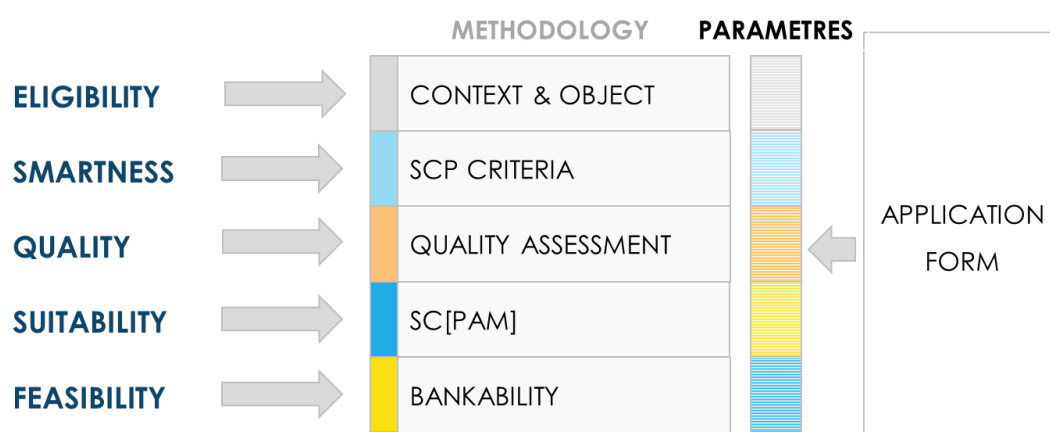


*Figure 7: Input to the methodology (Application form)*

The following sections further describe the criteria and contents to be analyzed in each of the conceptual assessment blocks previously described. Within each block's section, a more detailed description of the information included can be found, as well as an explanation of the background elements that have been used for its definition and the methodology used for questioning the applicant city and for the collection of information by the EIB evaluators.

## 4.1. CONTEXT AND OBJECT

The ASCIMER methodology has been tailored to evaluate the implementation of Smart City Projects in the Mediterranean Region. The smart city concept must be adapted to the context and to the particularities of the city and its region, thus, it is imperative to collect the necessary information in this territorial context.

The goal of this first block is not really evaluating but bringing together all the basic information related to the description of the city structure and characteristics, as well as that of the city context, and the project characterization itself. The information here retrieved will be used in future evaluation steps as inputs or references for the valuation of different items, with its most important use being the customization of the general application form and evaluation process that, in a starting point, is conceived to be adaptable to all sorts of projects covering all Smart City Dimensions.

It is moreover possible for many descriptive elements to be stored for future use when reviewing a specific applicant City, given that many of the elements relate to the context with the aim of capturing its reality.

| ELIGIBILITY | → | CONTEXT & OBJECT |
|---|---|---|
| SMARTNESS | → | SCP CRITERIA |
| QUALITY | → | QUALITY ASSESSMENT |
| SUITABILITY | → | SC[PAM] |
| FEASIBILITY | → | BANKABILITY |
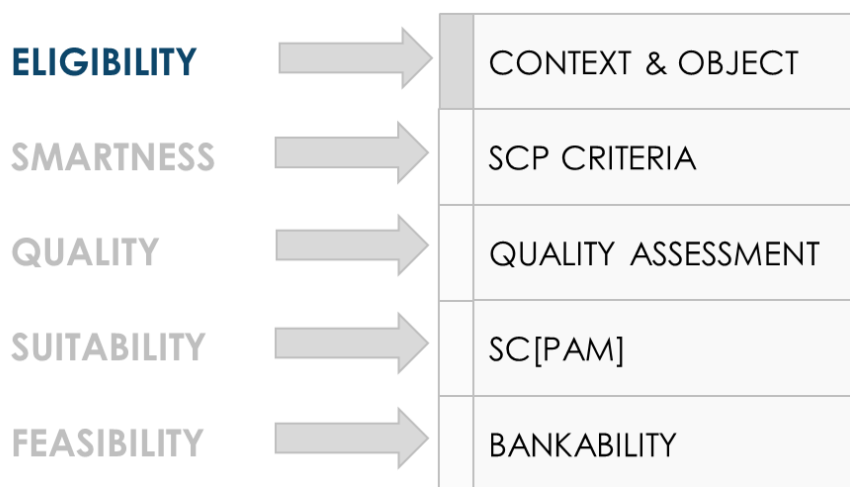
The main sub-sections contained in this block are Context Characterization, City Profile and main City Challenges, and the Project Characterization itself.

CONTEXT CHARACTERIZATION

Different contexts imply different solutions. Not only must the intrinsic characteristics of the city and its citizens be taken into account, but also factors such as the infrastructural reality of the city, the institutional framework where the project is going to be developed or the territorial implications that surpass the administrative boundaries of the city itself.

CITY PROFILE & MAIN CITY CHALLENGES

The aim of this sub-section is to understand the general features of the applicant city. City profile indicators are descriptive elements of the city itself and its citizens. They refer to physical characteristics, identity elements, population traits and/or managerial information.

Ideally, every city would have a collection of well-defined elements (a strategic vision, a sustainability strategy, a social contract) that would allow for the assessment of Smart City Projects under the framework already established. However as this is rarely the case, one key element of the proposed methodology would be to understand both the needs and challenges of the city where the project is intended to be implemented, taking into account the objectives and the needs of every city. The existence of a Strategic Plan has been identified by different experts as a key element for the success of the projects.

PROJECT CHARACTERIZATION

Given the complexity of the urban context, and the multiple dimensions that Smart City Projects can influence, the ASCIMER methodology has as an objective to be wide enough to be able to assess any Smart City Project, both short and long term ones. However, hardly any project has any impact on every one of these dimensions.

Consequently, classifying the project, splitting it into different actions and impacts is essential in order to adapt the criteria to every specific feature of the project.
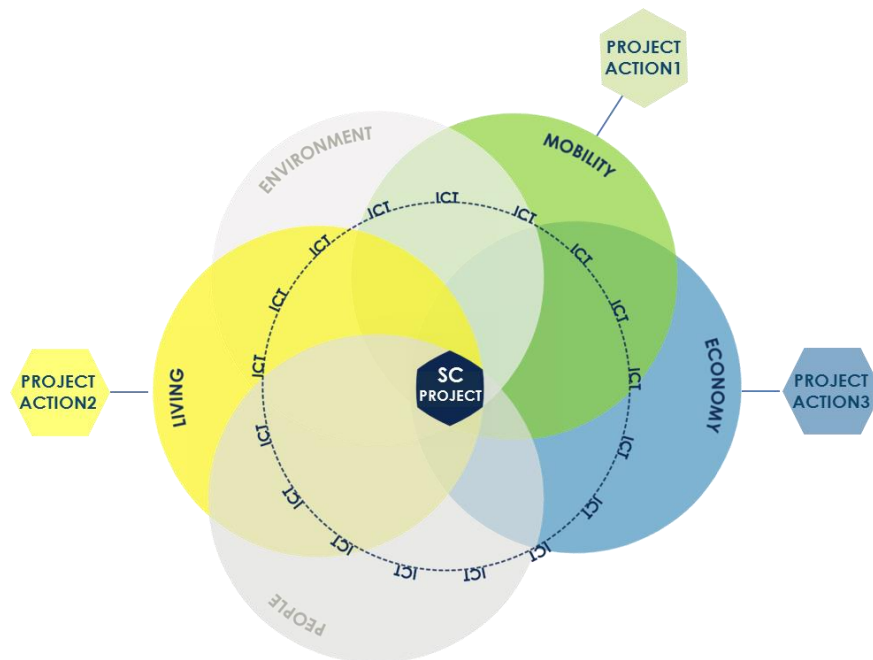


Figure 8. Smart City Project breakdown into project actions

The main elements of previous work that backup this part of the assessment are the Smart City Dimensions definition and the subsequent two-level breakdown into more specific project actions. This breakdown is used to frame and classify the specific actions and possible impacts of the project. These dimensions are: Governance, Economy, Environment, Mobility, People and Living.

Additionally, the Smart City Challenges defined in the first work package will be used as a framework that will help with the classification and prioritization of the needs of the city. The team has already analyzed the correlation between the challenges that affect one or more city dimensions and the project actions apprehended to solve them.

The applicant will be confronted with a set of questions, ranging from general ones that could be applied to any city, to more specific ones specific to the area where the project is expected to have an impact and the relevant challenges previously selected.

## 4.2. SMART CITY PROJECT CRITERIA

The Smart City Project Criteria block aims to reflect the match between the projects´ characteristics and the minimum characteristics required by the financing institution (EIB) for the call. As a conclusion of ASCIMER's previous work, a Smart City Project (SCP) has been defined as a project that generates a change and produces an impact leading towards a Smart City, and therefore towards the objectives of a Smart City. It should include technology (not only ICTs). SCPs should be tools which make cities more comfortable to live in and able to maintain and handle complexity, multiply interactions, recognize diversity and manage uncertainty. All of these factors are inherent characteristics of urban dynamics and constitute the attractiveness of cities and their current intelligence.
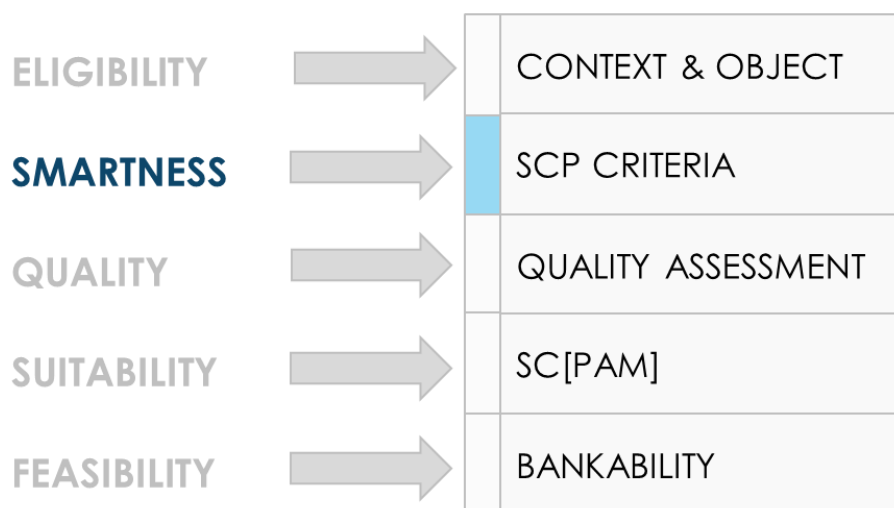


The main subsections contained in this block are Innovation, Integration and Inclusion. (see page 11of this document).

The applicant will be faced with a set of direct questions, to be answered mainly through a list of Yes/No or Yes/Partially/No options, followed by boxes where the applicant would have to introduce the explanation for the chosen answer (Rationale). This scheme will allow for a rapid discarding of projects considered incoherent with the goals of the Smart City financing line. Moreover, externality assessment will be carried out in this chapter, based on the selection of project action types.

## 4.3. QUALITY ASSESSMENT

In order to assess the quality of the project it is necessary to evaluate its capacity to address the objectives that a Smart City, and thus a Smart City project, should address at these two different scales. These objectives have been identified through bibliography review and through discussion with experts.
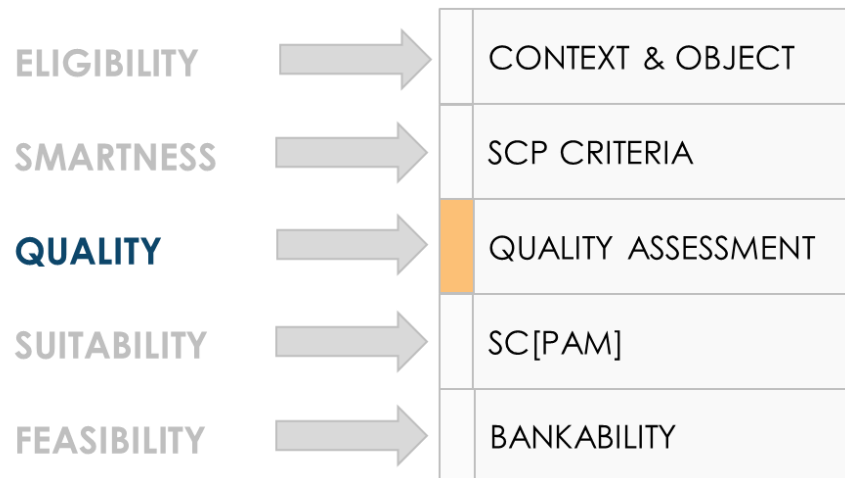


This assessment block must be considered taking into account two concepts: the scale of the evaluation of the project results and the main objectives that a Smart City Project should assess.

### A) SCALES

A two scale approach has been established for the evaluation of the projects. Whereas in many other methodologies the projects to be assessed belong to a relatively concrete sector, in this case the width of the spectrum for project's impacts has led towards the methodological segregation of the project assessment itself, and the expected impact assessment. The first one is conceived as common for most of the projects to be assessed, while the second one changes depending on the concrete project action type to be assessed.

### B) OBJECTIVES

Regardless of the two scale approach, both the project itself and its impacts need to be aligned with the objectives of the Smart City, identified as achieving a sustainable and resilient development, improving the efficiency of the existing and new infrastructure and increasing the quality of life of citizens.

One necessary remark is that, whereas all three objectives can be improved through both the project itself and through its expected impact, only efficiency and sustainability& resilience are easily measured for the project itself. Hence, the improvement in the quality of life of the citizens will be appraised directly for the impacts of the project and indirectly for projects themselves.

| | PROJECT level | Expected IMPACT for the Smart City |
|---|---|---|
| **EFFICIENCY** | x | x |
| **SUSTAINABILITY & RESILIENCE** | x | x |
| **QUALITY OF LIFE** | | x |

*Table 2: Objective evaluation in the two scales of the project*

The three Smart City objectives identified in the first ASCIMER work package were achieving a sustainable and resilient development, improving the efficiency of the existing and new infrastructure and increasing the quality of life of citizens. These objectives are here used to measure the quality of the project.

Efficiency

Smart City initiatives seek the efficiency of the existing and new infrastructure through:

- Interconnecting the different infrastructure components, services offered and people working with them.
- Reducing the costs in the long term, thanks to the monitoring and information sharing.

Sustainability & resilience

Although linked with efficiency, sustainability has a broader scope. The consensual definition of sustainable development is a "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". (as defined in the Brundtland report (WCED, 1987).

Resilience adds to that sustainable development the capability of recovering fast and of minimizing harm after an unexpected event or disaster takes place in the city.

Sustainability and resilience need to be achieved in the different fields of the Smart City as all of them are essential for its well-functioning. ASCIMER methodology for smart cities subdivides the assessment of these characteristics into Environmental sustainability & resilience, Economic sustainability & resilience and Social sustainability & resilience.

Quality of Life

Increasing the quality of life of its citizens constitutes a key objective of the Smart City. When working with the city there should never be forgotten that the final end of the city itself are

its inhabitants. Whenever a Smart City initiative is developed, its ultimate target ought to be to improve the quality of life of the citizens.

The first work package's project actions have an important role through all this section as they frame the potential scope of the project regarding the three abovementioned objectives.

### 4.3.1. Project Quality

The subdivision of the assessed project into the first work package's project actions allows the assessment of the particular project regarding its quality and the scope of its impacts.

For the quality assessment of the Project, a set of questions has been developed. It covers all three objectives and gathers the main considerations regarding quality that a project can fulfill. (See table 3.)

Each of the objectives has been divided in sub-objectives and then transformed into assessment criteria, with an associated question or indicator for which the information will be provided by the applicant. Several of the items require further explanations than the plain answer. Many of them are applicable to all projects, but cases in which a specific question or indicator may not apply have also been considered.

One important consideration in this part is that Smart City Projects need to pay attention to the different levels of access by citizenship: access to economic resources (distributional equity) and access to information and technology (digital divide). Is this choice possible, or do 'lock-in' mechanisms create physical, economic, social and cultural constraints? It is important for SCPs to be as inclusive as possible because win-win solutions are rare and losers and conflicts are inevitable. Thus externalities will be taken into account.

| Efficiency | | Efficiency in the use of resources. | |
|---|---|---|---|
| | | Synergies with other initiatives. | |
| | | Budget efficiency | |
| | | | **Average Score** |
| **Sustainability and Resilience** | Social | Choice & Provision of accessible facilities | |
| | | Employment | |
| | | Affordability | |
| | | Social Cohesion & Inclusion | |
| | | Safety and Security | |
| | | | **Average Score** |
| | Environmental | Greenhouse Gas Emissions | |
| | | Natural Environment | |
| | | Built Environment | |
| | | Resource Efficiency | |
| | | Climate Resilience | |
| | | Project Related Emissions & Pollution | |
| | | | **Average Score** |
| | Economic | Business Performance | |
| | | Human capital development | |
| | | Quality and Reliability | |
| | | Economic Rate of Return (ERR) | |
| | | Local and global connectivity | |
| | | | **Average Score** |
| | | | **Weighted Average Score** |
| **Quality of Life** | | Education | |
| | | Access to energy | |
| | | Environmental quality | |
| | | Finance | |
| | | Fire and emergency response | |
| | | Governance | |
| | | Health | |
| | | Safety | |
| | | Shelter | |
| | | Solid waste | |
| | | Telecommunications and innovation | |
| | | Transportation | |
| | | Urban planning | |
| | | Wastewater | |
| | | Water and sanitation | |
| | | | **Average Score** |

*Table 3: Quality Assessment: Classification of indicators*

## 4.3.2. Project Impact

A second -conceptual- step of the evaluation is the assessment of the expected impact derived from the project. In this regard, and given the broad spectrum of Smart City Projects, a thoughtful analysis has been conducted in order to associate each of the different project actions with the potential impacts on each of the Smart City Objectives.

Hence, for each of the six smart city dimensions, a crossed analysis between assessment criteria and specific project actions has to be carried out, highlighting the effective interactions. Then, after a thorough review of multiple urban indicators for each of the objectives and dimensions, specific indicators for each case have to be selected.

Based on the applicant's selection in the Description conceptual assessment block he will be presented with an additional set of indicators, ranging in general from 3 to 10 to verify the impacts of his specific project.

The combination of the different results obtained for each of the areas of assessment will provide the global result for the assessed project. After cross checking with experts and testing the methodology on four real projects in the Mediterranean Region, all three objectives have been given the same weight by default, which for the case of Project assessment implies that sustainability & resilience weights double than efficiency. The reason for this is that the quality of life improvement derived from the project design itself can not be inferred directly but in an indirect way through sustainability and resilience indicators. Through the analysis of indicators of existing methodologies, like the ISO 37120:2014, "Sustainable development of communities, Indicators for city services and quality of life", relations have been stablished among quality of life indicators and sustainability and resilience topics in order to collect the quality of life information at the project scale. Then, the effects that the project has in the quality of life in the city will be directly analyzed though the impact indicators.

Following the same process all three sub-objectives within sustainability & resilience, have received the same weight.

| | PROJECT level | | Expected IMPACT for the Smart City |
|---|---|---|---|
| **EFFICIENCY** | 1/3 | | 1/3 |
| **SUSTAINABILITY & RESILIENCE** | 2/3 | Environmental: 1/3 | 1/3 |
| | | Social: 1/3 | |
| | | Economic: 1/3 | |
| **QUALITY OF LIFE** | | | 1/3 |

*Table 4: Initial weights of the three Smart City Objectives*

*Default weights are the result of discussion with experts and through the analysis of diverse projects and good practices. They a can be modified depending on the criteria of the evaluator for each specific city or project.*

The final look of the assessment for this section would be a standard set of questions that the applicant or EIB evaluators have to answer through different methods (Likert scales, yes/no answers and measurement through indicators...). Each question will retrieve information about each of the sub-factors mentioned above when applicable. For the case of non-applicability of specific criteria the applicant instead will need to explain why the proposed project does not need to work on or doesn't impact the specified issue.

## 4.4. SC [PAM]: Smart City Projects Assessment Matrix

Smart City Projects objectives and city's objectives are linked at different levels, but we believe that a necessary coherency between the two is needed. Therefore, ASCIMER methodology for Smart City Projects aims at reflecting that coherence among levels, and considering the level of compatibility between different (and conflicting) dimensions.

It aims at verifying the coherence with the needs of the citizens of the city, region or area where the project is intended to be implemented.

With this aim, the proposed assessment matrix allows to interrelate all assessed elements and resume their consequences on how does the project help the city to be smarter.
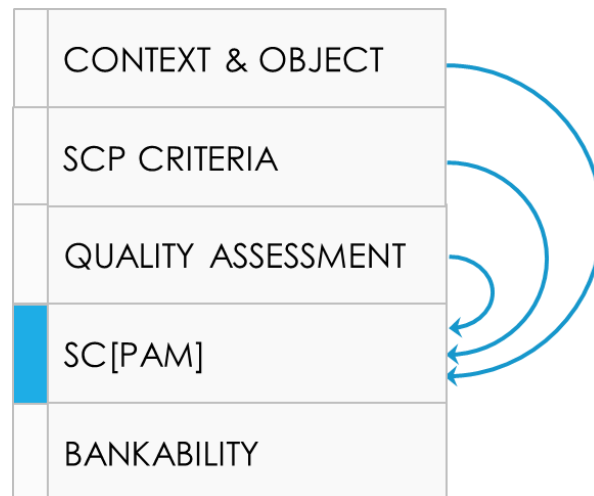


It is a matrix with two dimensions that offers partial and global results about the project, becoming a summary of all elements and allowing to extract information resulting of the combinations: it is smart in the holistic sense of the term. (see Table 5.)

**Table 5: Smart City Project Assessment Matrix (SC[PAM])**

ASCIMER Methodology aims to assess Smart City Projects, which have been defined as project that do not only fulfil Smart Characteristics by themselves, but also contribute to achieve a Smart City. The ASCIMER Smart City definition focuses on the Smart City as a tool to address Smart City challenges. These Challenges can be particularized to any region or area by identifying them and providing a first assessment by experts.

PARTICULARIZATION: MEDITERRANEAN REGION CHALLENGES

Such a methodology should take into account the particularities of the Mediterranean Region, and though in the first year of the project the Urban Challenges of the region where identified. These challenges become the first input of this methodology.

The other main output of ASCIMER first year was a Catalogue of Smart City Projects that identified different proposals organized in the described Smart City Dimensions. We consider that a Smart City Project can be divided into different project actions that are address different urban challenges. The matrix shows these interrelations and allows the assessment results to take it into account.

The different inputs of the matrix are assessed in different stages as follows:

## A) INPUT 1: CITY CHALLENGES

City Challenges become the first input to the SC[PAM]. This information has been collected in the DESCRIPTION stage, in which city managers is asked to identify which are their main challenges their city must assess and which weight would they assign to each of them (1-10).

| | | DIMENSIONS | | | | | |
|---|---|---|---|---|---|---|---|
| | | Smart Governance | Smart Economy | Smart Mobility | Smart Environment | Smart People | Smart Living |

**Table 6: City Challenges evaluation in the SC[PAM]**

Challenges Assessment (REF VALUE):

| REF VALUE | CHALLENGES ASSESSMENT |
|---|---|
| A | Low urban institutional capacities |
| A | Deficit of social services |
| B | Instability in governance |
| A | Gap government - governed |
| A | Centralization & lack of coordination |
| B | Lack of awareness |
| C | Shortage in access to information |
| C | Lack of equity |
| C | Unbalanced geographical development |
| B | High infrastructures deficit |
| C | Shortage in access to technology |
| B | Lack of competitiveness |
| B | Lack of urban economy diversification |
| B | Important role of the informal economy |
| A | Lack of public transport |
| B | Increase of private car |
| A | Pollution |
| A | Very rapid urbanization |
| B | Lack of quality on neighbourhoods |
| A | Unneficient resources cycle |
| A | Climate change effect |
| A | Urban poverty and inequality |
| A | Threats to cultural identity |
| B | Low educational level and digital skills |
| B | High obstacles to social mobility |
| C | Lack of accessible leisure facilities |
| A | Urban violence and insecurity |

In this case, the methodology is particularized to the Mediterranean Region. Identified Mediterranean Region Urban Challenges are evaluated in two different phases:

Experts Prioritization: Selected Experts of the ASCIMER Project belonging to Universities and Municipalities of the Mediterranean Region will provide a first filter to the Smart City Challenges, weighting their importance in a scale from A, B or C. This value will be used as a reference to compare with the importance given to the different challenges by municipalities. When a contrast exists between the weights given by experts and by municipalities, the second ones will have to provide strong evidence for their choice.

Municipalities Prioritization: Each municipality aiming to assess their Smart City Projects in order to obtain financing must assess in the description stage the challenges their own city must face and provide weights according to their importance, from 1 to 10.

### B) INPUT 2: SMART CITY PROJECTS ASSESSMENT

The second input of the SC [PAM] is the identification of the different Project Actions that compose the Smart City Project to be assessed. For the identification of the Project Actions, description and examples will be provided.

**DIMENSIONS**

| Smart Governance | Smart Economy | Smart Mobility | Smart Environment | Smart People | Smart Living |
|---|---|---|---|---|---|

**PROJECT ACTIONS:** SGo1 SGo2 SGo3 SGo4 SGo5 SEc1 SEc2 SEc3 SEc4 SEc5 SMo1 SMo2 SMo3 SMo4 SMo5 SMo6 SMo7 SEn1 SEn2 SEn3 SEn4 SEn5 SEn6 SEn7 SPe1 SPe2 SPe3 SPe4 SPe5 SLi1 SLi2 SLi3 SLi4 SLi5 SLi6 SLi7

QUALITY ASSESSMENT

**CHALLENGES**

| REF VALUE | CHALLENGES ASSESSMENT |
|---|---|
| A | Low urban institutional capacities |
| A | Deficit of social services |
| B | Instability in governance |
| A | Gap government - governed |
| A | Centralization & lack of coordination |
| B | Lack of awareness |
| C | Shortage in access to information |
| C | Lack of equity |
| C | Unbalanced geographical development |
| B | High infrastructures deficit |
| C | Shortage in access to technology |
| B | Lack of competitiveness |
| B | Lack of urban economy diversification |
| B | Important role of the informal economy |
| A | Lack of public transport |
| B | Increase of private car |
| A | Pollution |
| A | Very rapid urbanization |
| B | Lack of quality on neighbourhoods |
| A | Unneficient resources cycle |
| A | Climate change effect |
| A | Urban poverty and inequality |
| A | Threats to cultural identity |
| B | Low educational level and digital skills |
| B | High obstacles to social mobility |
| C | Lack of accessible leisure facilities |
| A | Urban violence and insecurity |

**Table 7: Project Actions evaluation in the SC[PAM]**

Only the project actions in which the assessed Smart City Project is divided will be evaluated, and thus only some of the challenges will be addressed, as identified by the colored cells.

The results of the Smart City Projects Assessment Stage will be used to weight the different Project Action in which it is divided.

- Project Assessment: The result will be one common value to the complete Smart City Project.
- Impacts Assessment: This assessment will provide a different value for each of the assessed Project Actions



Table 8: Project actions Input in the SC[PAM]

The results of the Smart City Projects Assessment Stage will be used to weight the different Project Action in which it is divided.

Project Assessment: The result will be one common value to the complete Smart City Project.

Impacts Assessment: This assessment will provide a different value for each of the assessed Project Actions.

C) PARTIAL EVALUATION

The SC[PAM] allows a partial evaluation in 3 steps:

First, it allows a combination of the different abovementioned values assigned to the Urban Challenges and Project Actions. **On each row**, the weighting values assigned by the municipality to each of the challenges (taking the weighting provided by experts as a double-check reference) provide a **priority value per Urban Challenge**. **On each column**, the **combination of the value obtained in the assessment of the Project characteristics, with the value of the impact of each of the project actions** through the calculation of the mean, provides a different final value per Project Action.

On a second step it allows the **combination of these values via their multiplication on the colored intersections**. From this combination, highlighted in the Matrix on Table 9, the project actions with a higher final value, and the challenges ranked as priority weigh more in the global assessment result. These highlighted values also offer a more visual way for an initial overview in the assessment, providing not only quantitative information but a qualitative appraisal of the proposal.

It is important to notice that as the colored intersections stand for predefined potential impacts. Once the table is filled, the evaluator should check if any of the preset impacts are not present because they are not applicable to the specific project, in which case he should replace the value with "0" or are applicable but not present in the proposal, in which case he should leave the cell empty.

Thirdly it may be of interest to analyze the **partial results** of the matrix (in orange on Table 9.) in order to provide suggestions for the improvement of the Project if it were to be accepted "with conditions":

-Each row provides a **global value per addressed challenge** that results of the combination of the values of the matrix assigned to each Urban Challenge. This can help to evaluate which of the Challenges are the ones the project is mainly addressing.

-On the other hand, it also provides a different global **value per Project Action**, which results of the combination of the values assigned to each Project Action. This can help to identify which of the project actions generates a higher impact.

**Table 9: Smart City Projects Assessment: Partial results**

## D) GLOBAL MATRIX EVALUATION

The values that result from the crossing of the Urban Challenges weighting and of the Project Actions Assessment are combined through addition in order to provide a global result of the assessment of the project. As it has been already explained this result takes into account not only the general quality of the proposed Smart City Project but also its impacts towards the goals of the Smart City, which are the main objectives of the implementation of the project.

**Table 10: SC[PAM] results**

The combination of the obtained value, when contrasted with the maximum value that could be reached by the proposal can lead to three different situations:

a) project **suitable for financing**: If the value that results from de SC [PAM] is higher than 70% and the result of the bankability assessment is positive, the project is considered suitable for financing.

b) project **suitable for financing with conditions**: If the value that results from de SC [PAM] is higher than 40% and lower than 70% and the result of the Bankability assessment is positive, the project is considered in general terms suitable for financing. However, the Project will have to include certain changes in order to better address the challenges of the city and to improve its performance in the SC Project Assessment.

c) project **not suitable for financing**: If the value that results from de SC [PAM] is lower than 40% or either the result of the Bankability assessment is negative, the project will not be suitable for financing, as it is not coherent with the challenges of the city.

## 4.5. BANKABILITY

The Bankability section aims to capture the characteristic of the project being possible and likely to be achieved. It holds technical criteria on the capabilities of the municipality in terms of means and financial resources, analyzing the risks that may lead to the project not reaching its goals, or to the borrowing entity not being able to comply with its financial obligations.

| |
|---|
| CONTEXT & OBJECT |

| |
|---|
| SCP CRITERIA |
| QUALITY ASSESSMENT |
| BANKABILITY |
| SC[PAM] |

Two main subsections are considered regarding bankability for Smart City projects, technical feasibility and financial feasibility.

Financial feasibility takes into consideration elements like financial burden and budget constraints, expected financial performance of the project, demand forecast analysis or creditworthiness.

Technical feasibility takes into consideration elements like soundness of the design, the compliance of the proposal with local regulations and protocols, the compliance of the proposal with procurement regulations where appropriate, the maturity stage of the implemented technologies, implementation and monitoring capabilities and operational sustainability.

For the analysis of feasibility an essential input of the methodology are the acceptable thresholds of the EIB regarding financial and technical risk. Some key elements to be assessed have been taken and adapted from former EIB's methodologies for project assessment in other fields, as well as other institution's.

The applicant or the EIB evaluator will answer a set of questions in the financial risk assessment, mainly general ones that can be applied to any organization borrowing money.

Also more specific questions will be set in the technical risk assessment depending on the area where the project is expected to have an impact.

## 4.6. ASCIMER SMART CITY PROJECTS ASSESSMENT METHODOLOGY OVERVIEW

As described at the beginning of this document, this methodology will recover the information through an application form that will be filled by Municipalities and EIB evaluators in order to obtain financing for the proposed Smart City Projects. As a summary, this table synthesizes the information to be obtained through the different steps of the methodology and of the questions that will be part of the application form. This information will be organized in steps that include qualitative questions, descriptions of the rationale of the answers, multi-choice selection and quantitative weighting associated to them and quantitative data. The assessment will evaluate the answers. The Smart City Project Assessment Matrix (SC[PAM]) will summarize all the collected information providing a global overview of the project and its impact in fostering a Smart City.

| METHODOLOGY STEP | INFO OBTAINED | FORMAT | FILLED BY |
|---|---|---|---|
| **CONTEXT & OBJECT** | CITY PROFILE | QUESTIONS (qualitative) | EVALUATOR |
| | MAIN CITY CHALLENGES | SELECTION + VALORATION | CITY |
| | PROJECT CARACTERIZATION | SELECTION | CITY / EVALUATOR |
| | CONTEXT CARACTERIZATION | QUESTIONS (qualitative) | EVALUATOR |
| **SMART CITY PROJECT CRITERIA** | INNOVATION INTEGRATION PARTICIPATION | QUESTIONS (Y/N + RATIONALE) | EVALUATOR |
| **QUALITY ASSESSMENT** | EFFICIENCY SUSTAINABILITY & RESILIENCE QUALITY OF LIFE | QUESTIONS (qualitative + 1-5 valoration) + INDICATORS (quantitative + 1-5 thresholds) | EVALUATOR |
| **SC[PAM]** | **FINAL RESULT** | MATRIX | AUTOMATICAL + RESULTS FROM PREVIOUS SECTIONS |
| **BANKABILITY** | FINANCIAL | INDICATORS (EIB) | EVALUATOR |
| | TECHNICAL | INDICATORS (EIB) | EVALUATOR |

Table 11: ASCIMER Smart City Projects Assessment Methology overview

ASSESSING SMART CITY INITIATIVES IN THE MEDITERRANEAN REGION

Figure 9: Use of the methodology in the assessment process

# 5. MEDITERRANEAN REGION CASE STUDY

## 5.1. CHALLENGES

In the Mediterranean region we can distinguish two areas in terms of technological and human development; the first of them is the European Union (northern cities of the Mediterranean) and the second one is the area delimited by North Africa and the Middle East from Morocco to Turkey (south Mediterranean). Also within the two, challenges to be addressed by cities differ depending on the area the city belongs to.

ASCIMER methodology takes into account the challenges of cities in the Mediterranean Region in order to assess projects in the right context. The identification of challenges has been developed through the information collected from international organizations' documents, the development of focus groups (in the 2nd ASCIMER Workshop) and the information collected in field visits. As a result, 27 challenges have been identified that can be classified in 6 dimensions: governance, economy, mobility, environment, people and living.



*Figure 10: South & East Mediterranean City challenges correlated with Smart City dimensions*

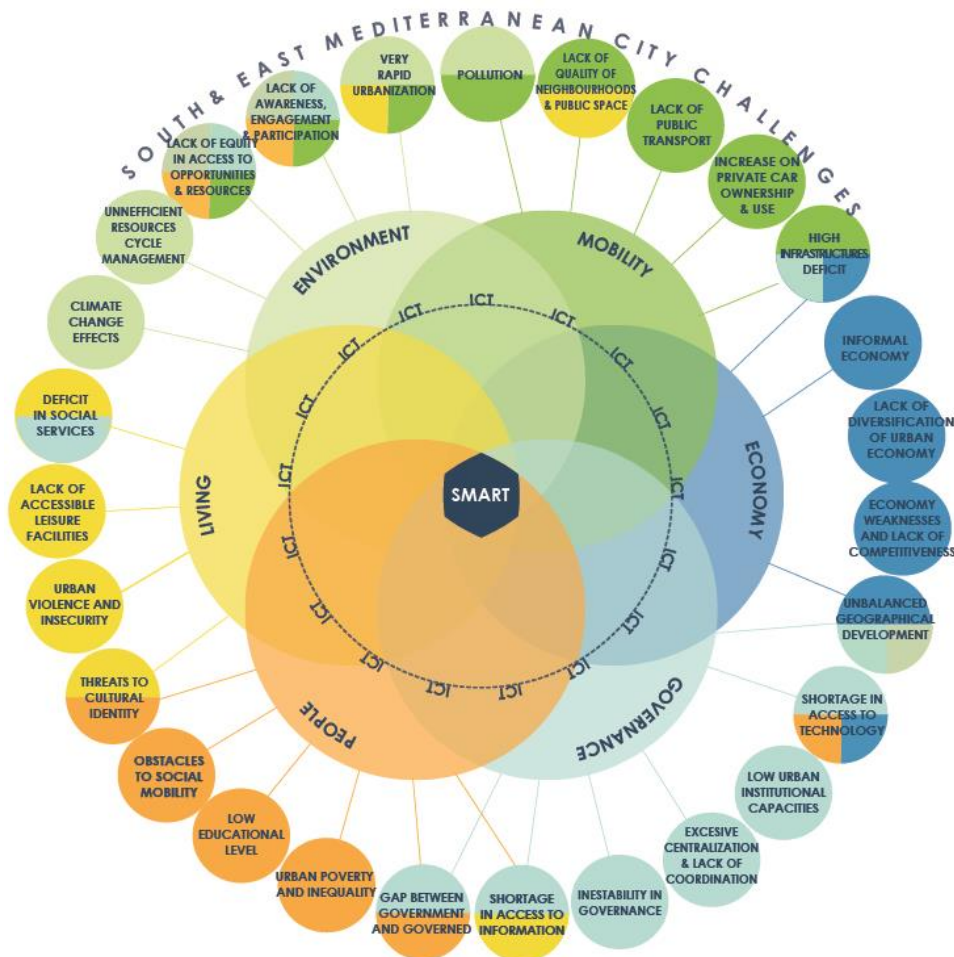| | |
|---|---|
| **Low urban institutional capacities** | Urban governance systems present certain weaknesses in formal and informal institutions, with lack of flexibility to respond to popular demands. Improvements are needed with regard to bureaucracy, service management and data collection. |
| **Instability in governance** | More democratic governance modes are being introduced in the region, replacing the traditional political and economic dynamics as well as undemocratic structures, with changes generating instability. Cities play a key role in this process and are very directly affected by them. |
| **Gap between government and governed** | The gap between decision makers and the citizenship regarding economic, political and cultural aspects must be reduced. People seek to access power and control resources but well-established networks make this differences last in time. |
| **Unbalanced geographical development** | Most of the economic activities of the Region are concentrated in a few large cities along the coast. It is necessary to pay more attention to the needs of secondary cities that generally receive less attention, increasing regional resilience and sustainability. |
| **Deficit of social services** | Demographic and cultural changes ask for an improvement of social services in cities in order to create better working and living conditions as well as new economic opportunities. |
| **Excessive centralization & lack of institutional coordination** | Due to the unbalanced power distribution among administrations and the lack of institutional coordination, most municipalities do not have enough authority and jurisdiction to enact autonomous actions. There is a need of decentralization and coordination. |
| **Lack of awareness, engagement & participation** | There is a lack of awareness of the population resulting in insufficient involvement and participation, which are key to solve any challenge in cities. Specific programs and a strong political will are necessary to overcome these problems. |
| **Shortage in access to information** | There is a general deficit in the access to information due to 1) reduced accessibility for citizenship, originated in the lack of spread of information from the governmental side and 2) communication deficits inside the governmental level and among the governmental institutions. |
| **Lack of equity in access to opportunities and resources** | The existing social gaps among different population groups due to traces like age, gender, origin, class, disabilities, etc. that influence economic opportunities, access to resources and environmental conditions needs to be reduced, globally increasing access to employment, housing, education, etc. |
| **High infrastructures deficit** | In the region a general infrastructures deficit exists. It is necessary to promote the renewal and improvement of the existing networks for mobility (road networks and rail systems), energy distribution, water supply and treatment, waste management, etc. |
| **Shortage in access to technology** | An improvement in the access to new technologies, and especially to communication technologies is needed, as well as an improvement of the citizens' digital skills. |
| **Economy weaknesses and lack of competitiveness** | Business environment presents a lack of openness and competitiveness and needs easier and more equal access to financing and business opportunities. Economic development must become more self-driven and innovative. |
| **Lack of diversification on urban economy** | Urban economies in the Region tend to focus in one or a few sectors, reducing their resilience. Being urban unemployment a problem, the location of diverse productive tissues in accessible positions in cities becomes crucial. |
| **Excessive weight of the informal economy** | Informal economy plays a key role in the economy of the analyzed countries due to its wide presence and to the necessary opportunities it provides for the less well off. These schemes, even if they cannot be set under control, must be taken into account. |
| **Lack of accessible and affordable public transport** | It is necessary to develop policies that foster new modes of transport to make a change towards more sustainable and inclusive models. Inclusive public transport systems that enables connectivity from all parts of the city must be implemented. |
| **Increase in private car ownership and use** | The private car is seen as a status symbol and as a sign of progress. This fact, linked to inefficient mobility policies and to financial incentives and an increase in economic resources, boosts private car use and ownership. Measures must be taken to reverse this trend. |
| **Pollution** | Air pollution (due to mobility models), water and land (due to resources management models) are key issues in cities in that affect life in cities and also the environmental conditions of the Region. |
| **Very rapid urbanization** | As cities are extending their limits in a very fast process, special attention must be paid to the way that new developments take place. They should grow in a way that minimizes the damage to the environment, ensures the protection of cultural assets and considers economic inequalities. |
| **Lack of quality on neighbourhoods and public space** | Quality of public space is low regarding aspects like greenery, safety aspects, climate adaptation, walkability and accessibility. Efforts in improving these features should be |

| | encouraged. The reduction of private car use in public spaces is a priority strongly affecting to this aspect. |
|---|---|
| **Unneficient resources management** | There is a lack of efficiency in the management of water, waste and energy resources, even lacking public management systems for this purpose in some areas. Cities need to develop plans for increasing it. |
| **Climate change effects** | Climate change is expected to increase extreme weather behaviors and emphasize desertification and water problems. Droughts, floods and extreme climatic events need to be taken into account in urban development plans. |
| **Urban poverty and inequality** | Increase on population, rural-urban migrations and the refugee crisis (with a lack of employment opportunities and social policies) have led to an increasing percentage of people living below the poverty line. This problem leads to strong spatial segregation in cities. |
| **Threats to cultural identity** | There is a need of promotion of new culture- based proposals for urban development in the area, as well as interventions in heritage conservation and revitalization in the historic centers. Also traditional economic activities should be looked after, taking into account the needs of citizens. |
| **Low educational level and digital skills** | An important share of population presents a low educational level that needs to be increased in order to leverage development potential. Capacity building and fostering digital skills is key for population in cities in order to foster their inclusion in cities. |
| **High obstacles to social mobility** | Societal groups are strictly defined and not permeable, affecting the vision of the future among youth and new generations. This is not a problem of reality (current inequality) but regarding the possibility of change in the future (opportunity of been more equal), and is linked to migration. |
| **Urban violence and insecurity** | As violence and insecurity has grown significantly, it may have negative impacts on quality of life in cities, as well as in economic development. Social policies need to be developed to address this problem. |
| **Lack of accessible leisure facilities** | In many cities there is a lack of equal accessibility to leisure facilities. The provision of leisure facilities and its location in accessible places to all kind of citizens is necessary. |

*Table 12: Urban challenges in the South and East-Mediterranean Region*

The south Mediterranean territory is highly urbanized, more than half its population lives in cities, but the development models that have been followed are based in past European ones that did not take into account the particularities of the south Mediterranean society. Development models for these urban areas should be revised and include the specific requirements of their societies, such as the informality as a way of urban development, the awareness of the lack of certain basic services or the particular conditions of the Government models.

The main challenges of the south Mediterranean cities are related with the scarcity of resources, such as water or food. This challenge will become higher as the effects of the climate change continue. Severe droughts are expected to increase during the following years, and so will do the urgency for water supply and the diminishing of the agriculture production. Likewise, the high infrastructure deficit these countries have, with their mobility, water and energy network in bad conditions make that the small resources available are not as optimized as they could be. Improving the deployment of the supplies networks is as important as rising the efficiency of the existing ones, so that the loss in the distribution of the basic services is reduced to a minimum.

Poverty and urban insecurity are the other major challenges. Living conditions in the south Mediterranean cities have less attractive than in the north Mediterranean ones and that has its effects in the loss of capacity to attract new businesses and talent. Government instability, high levels of violence and corruption and a high level of social and spatial polarization are common issues in the south Mediterranean areas. Improving these social and living conditions will establish the foundations for building a better urban future.

Finally, one big drawback that a Smart City initiative in a southern Mediterranean city should carefully take into account is the small penetration of smartphones or ICT technology has on its population. Due to the high levels of poverty, not a vast majority of the population living in these cities has access to the necessary technology to make certain Smart City initiatives available to all the citizens. Furthermore, there are also a great number of people technology-illiterate. Making available and affordable the necessary technology and fostering educative programs so that the citizens will have knowledge and access to the needed ICT, will be another challenge to have in mind when planning a new initiative.

## 5.2. CASE STUDIES

During the last year of the project the ASCIMER methodology has been tested and calibrated through its application to four different case studies. The work was carried out through direct collaboration with local experts related to the development of the project that provided the necessary information. This process has allowed to validate and introduce corrections to the methodology in order to make it truly applicable to the SC projects being developed at the time.

All of the cases belong to the South and East Mediterranean Region (figure 12):

- Zenata eco-city; Casablanca, Morocco.
- GIS municipal Platform; Ramallah, Palestine.
- E-vehicle pilot; Amman, Jordan.
- Taparura new sustainable urban development; Sfax, Tunisia.



Figure 112: Location of selected projects where ASCIMER methodology has been tested

ASSESSING SMART CITY INITIATIVES IN THE MEDITERRANEAN REGION

## 5.2.1. CASE STUDY 1: ZENATA ECO-CITY; CASABLANCA, MOROCCO

| Zenata Eco-city | Casablanca-Mohammedia, Morocco |

### Description
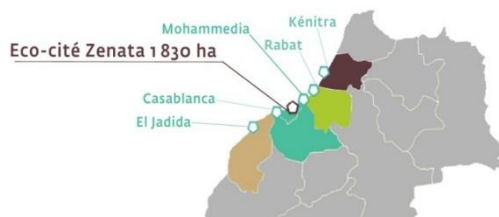
Zenata eco-city is a new urban development between Casablanca and Mohammedia. The city has been developed with strong sustainability criteria and integrating uses (industry, housing, facilities and tourism). It is projected to accommodate 300.000 inhabitants and create 100.000 jobs. The development includes primary healthcare and education service, a commercial district and a logistics centre.

Eco-cité Zenata 1 830 ha

### Context

**Region**
(Grand-Casablanca)

**Population:** 4,270,750
**% total population of country:** 23.4%
**GDP per capita:** 1,228,67 €
**% GDP per inhabitant:** 23,4%
**Poverty rate:** 3.2 %
**Employment rate:** 47 %
**Unemployment rate:** 11.6%
**Urbanization rate:** 95%
**Annual population change:** 1.64%
*Tipo de cambio medio 2016: 1€=10,8607 DH

**City**
(Casablanca)

**Population:** 3,359,818
**% Population of the region:** 78.7%
**Density:** 23,830.7 hab/km²
**Annual population change:** 1.03%

**ICT (National level)**

**ICT Development Index:** 4.47
**Internet Users:** 57.4 %

| REF. VALUE | CHALLENGES | Local gov. value |
|---|---|---|
| A | (CH1) Low urban institutional capacities | 8 |
| A | (CH2) Deficit of social services | 10 |
| B | (CH3) Instability in governance | 2 |
| B | (CH4) Gap between government and governed | 4 |
| A | (CH5) Excessive centralization & lack of institutional coordination | 5 |
| B | (CH6) Lack of awareness, engagement & participation | 8 |
| B | (CH7) Shortage in access to information | 8 |
| A | (CH8) Lack of equity in access to opportunities and resources | 5 |
| A | (CH9) Unbalanced geographical development | 8 |
| A | (CH10) High infrastructures deficit | 5 |
| B | (CH11) Shortage in access to technology | 7 |
| B | (CH12) Lack of competitiveness | 5 |
| B | (CH13) Lack of diversification on urban economy | 6 |
| B | (CH14) Important role of the informal economy | 9 |
| A | (CH15) Lack of accessible and affordable public transport | 10 |
| A | (CH16) Increase in private car ownership and use | 8 |
| A | (CH17) Pollution | 9 |
| A | (CH18) Very rapid urbanization | 9 |
| A | (CH19) Lack of quality on neighbourhoods and public space | 9 |
| A | (CH20) Unneficient resources cycle management | 7 |
| B | (CH21) Climate change effect | 8 |
| A | (CH22) Urban poverty and inequality | 10 |
| B | (CH23) Threats to cultural identity and particularities | 6 |
| A | (CH24) Low educational level and digital skills | 9 |
| B | (CH25) High obstacles to social mobility | 6 |
| B | (CH26) Lack of accessible leisure facilities | 9 |
| B | (CH27) Urban violence and insecurity | 10 |

| Smart Economy | SEc1. Innovation |
|---|---|
| | SEc2. Entrepreunership |
| | SEc4. Productivity |
| Smart Mobility | SMo2. Public Transport |
| | SMo6. Clean, non-motorised options |
| | SMo7. Multimodality |
| Smart Environment | SEn2. Energy efficiency |
| | SEn3. Urban Planning and urban refurbishment |
| | SEn4. Smart building and building innovation |
| | SEn5. Resources management |
| | SEn6. Environmental protection |
| Smart Living | SLi1. Tourism |
| | SLi3. Healthcare |
| | SLi6. Welfare & Social Inclusion |
| | SLi7. Public spaces management |
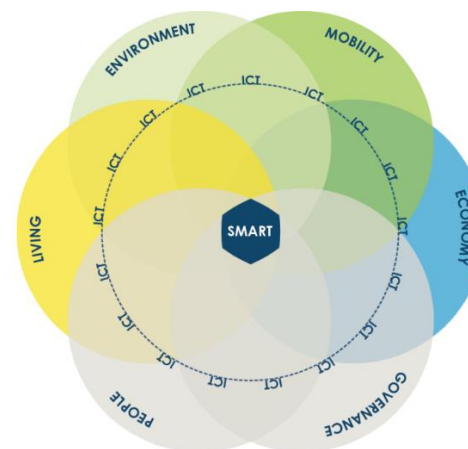
## Context & Object

**Strengths**
- Integrated project
- Well defined
- Match with urban needs

**Possible improvements**
- Missing challenges

**77 %**

## SCP Criteria

### Innovation, Integration, Inclusion

**Strengths**
- Inclusion
- Integration

**Possible improvements**
- Exploit innovative potential

**74 %**

## Quality Assessment

### Project

| Efficiency: | Sustainability & Resilience: | Quality of life: |
|---|---|---|
| 80% | 68% | |

**71%**

## Impact

**Strengths**

**Possible improvements**

---

### PROJECT ACTIONS

| | | | Smart Economy | | | Smart Mobility | | | Smart Environment | | | | | Smart Living | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | SEc1 | SEc2 | SEc4 | SMo2 | SMo6 | SMo7 | SEn2 | SEn3 | SEn4 | SEn5 | SEn6 | SLi1 | SLi3 | SLi6 | Value per challenge | Max Value / Challenge |
| | | project | 7,12 | 7,12 | 7,12 | 7,12 | 7,12 | 7,12 | 7,12 | 7,12 | 7,12 | 7,12 | 7,12 | 7,12 | 7,12 | 7,12 | | |
| | | city impact | 7,00 | 6,86 | 7,50 | 9,33 | 8,00 | 8,00 | 7,33 | 7,33 | 8,00 | 8,00 | 7,33 | 8,00 | 9,33 | 7,33 | | |
| | | max. value | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | | |
| REF. VALUE | | Assessment Value / Local government | 7,062 | 6,99 | 7,31 | 8,23 | 7,56 | 7,56 | 7,23 | 7,23 | 7,56 | 7,56 | 7,23 | 7,56 | 8,23 | 7,23 | | |
| A | CH1 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3200 |
| A | CH2 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 72 | 0 | 0 | 0 | 0 | 0 | 82 | 72 | 227 | 4000 |
| B | CH3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 14 | 1400 |
| B | CH4 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 33 | 29 | 62 | 4800 |
| A | CH5 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3000 |
| B | CH6 | 8 | 0 | 56 | 0 | 0 | 0 | 0 | 58 | 0 | 60 | 60 | 0 | 0 | 0 | 0 | 235 | 9600 |
| B | CH7 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4800 |
| A | CH8 | 5 | 0 | 35 | 0 | 41 | 38 | 0 | 36 | 36 | 38 | 38 | 0 | 0 | 41 | 36 | 339 | 12000 |
| A | CH9 | 8 | 0 | 0 | 0 | 66 | 60 | 60 | 0 | 58 | 0 | 60 | 58 | 0 | 0 | 0 | 363 | 14400 |
| A | CH10 | 5 | 0 | 0 | 0 | 41 | 38 | 38 | 0 | 36 | 0 | 38 | 36 | 0 | 41 | 0 | 268 | 6500 |
| B | CH11 | 7 | 49 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 49 | 4200 |
| B | CH12 | 5 | 35 | 35 | 37 | 0 | 0 | 0 | 36 | 0 | 0 | 38 | 0 | 38 | 41 | 36 | 296 | 9500 |
| B | CH13 | 6 | 42 | 42 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 45 | 0 | 0 | 130 | 4800 |
| B | CH14 | 9 | 0 | 63 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 65 | 128 | 4500 |
| A | CH15 | 10 | 0 | 0 | 0 | 82 | 76 | 76 | 0 | 72 | 0 | 0 | 0 | 0 | 0 | 72 | 378 | 8000 |
| A | CH16 | 8 | 0 | 0 | 0 | 66 | 60 | 60 | 0 | 58 | 0 | 60 | 0 | 0 | 0 | 0 | 305 | 8800 |
| A | CH17 | 9 | 0 | 0 | 0 | 74 | 68 | 68 | 65 | 65 | 68 | 68 | 65 | 0 | 0 | 0 | 541 | 13500 |
| A | CH18 | 9 | 0 | 0 | 0 | 0 | 68 | 0 | 0 | 65 | 68 | 68 | 65 | 0 | 0 | 65 | 399 | 13500 |
| A | CH19 | 9 | 0 | 0 | 0 | 74 | 68 | 68 | 0 | 65 | 68 | 0 | 65 | 0 | 0 | 65 | 473 | 14400 |
| A | CH20 | 7 | 0 | 0 | 0 | 58 | 53 | 53 | 51 | 0 | 53 | 53 | 51 | 0 | 0 | 0 | 371 | 7000 |
| B | CH21 | 8 | 0 | 0 | 0 | 66 | 60 | 60 | 58 | 58 | 60 | 60 | 58 | 0 | 0 | 0 | 481 | 9600 |
| A | CH22 | 10 | 0 | 70 | 0 | 82 | 76 | 76 | 0 | 72 | 76 | 76 | 0 | 76 | 82 | 72 | 757 | 24000 |
| B | CH23 | 6 | 0 | 42 | 0 | 0 | 0 | 0 | 0 | 43 | 0 | 0 | 43 | 45 | 0 | 0 | 174 | 9000 |
| A | CH24 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3600 |
| B | CH25 | 6 | 0 | 42 | 0 | 0 | 0 | 0 | 0 | 43 | 45 | 0 | 0 | 0 | 49 | 43 | 223 | 9600 |
| B | CH26 | 9 | 0 | 0 | 0 | 74 | 68 | 68 | 0 | 0 | 65 | 68 | 0 | 0 | 0 | 65 | 408 | 10800 |
| B | CH27 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 72 | 0 | 0 | 0 | 0 | 0 | 0 | 72 | 145 | 7000 |
| | Value per project action | | 127 | 384 | 37 | 724 | 734 | 628 | 304 | 882 | 605 | 620 | 441 | 204 | 370 | 708 | 6768 | ASSESSMENT |
| | max value/project action | | 300 | 800 | 100 | 1100 | 1200 | 1000 | 600 | 1500 | 1000 | 1100 | 800 | 400 | 700 | 1300 | Good | BANKABILITY |
| | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 75 | FINAL RESULT |

**CHALLENGES**

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## Results: 6.768  75.1%  / Suitable for Financing

## 5.2.2. CASE STUDY 2: MUNICIPAL GIS PLATFORM; RAMALLAH, PALESTINE

### Description

GIS platform developed by Ramallah's municipality. The system collects, manages, compiles, reviews, analyzes and visualizes spatial data describing city details. Each department at the municipality has an App on the platform. Data can be updated in real time, so that it provides logistical support to municipal services. The app it also available to citizen through web applications, such as Tourist Interactive Map and Municipal Mapping. Complaints and feedback can be posted on the app.

### Context

#### Region
(Ramallah & al-Bireh)

**Population**: 290.401
**GDP per capita: 527,918 €**
**Poverty rate: 18 % (West Bank)**
**Employment rate:** 80,3 %
**Unemployment rate:** 19,7%
**Annual population change:2,83 %**
*Currency rate: 1€=1,07155 $

#### City
(Ramallah)

**Population:** 70.000
**Density:** 3684 hab/km$^2$
**Annual population change: 2,83%**
**GDP per capita: 2.117,8 €**
*Currency rate: 1€=1,07155 $

#### ICT (National level)

**ICT Development Index:** 4,16 (2013)
**Internet Users:** 57,7 %

| REF. VALUE | CHALLENGES | Local gov. value |
|---|---|---|
| A | (CH1) Low urban institutional capacities | 8 |
| A | (CH2) Deficit of social services | 6 |
| B | (CH3) Instability in governance | 7 |
| B | (CH4) Gap between government and governed | 7 |
| A | (CH5) Excessive centralization & lack of institutional coordination | 6 |
| B | (CH6) Lack of awareness, engagement & participation | 6 |
| B | (CH7) Shortage in access to information | 4 |
| A | (CH8) Lack of equity in access to opportunities and resources | 3 |
| A | (CH9) Unbalanced geographical development | 7 |
| A | (CH10) High infrastructures deficit | 7 |
| B | (CH11) Shortage in access to technology | 10 |
| B | (CH12) Lack of competitiveness | 6 |
| B | (CH13) Lack of diversification on urban economy | 7 |
| B | (CH14) Important role of the informal economy | 5 |
| A | (CH15) Lack of accessible and affordable public transport | 9 |
| A | (CH16) Increase in private car ownership and use | 9 |
| A | (CH17) Pollution | 5 |
| A | (CH18) Very rapid urbanization | 10 |
| A | (CH19) Lack of quality on neighbourhoods and public space | 8 |
| A | (CH20)Inefficient resources cycle management | 7 |
| B | (CH21) Climate change effect | 7 |
| A | (CH22) Urban poverty and inequality | 2 |
| B | (CH23) Threats to cultural identity and particularities | 5 |
| A | (CH24) Low educational level and digital skills | 1 |
| B | (CH25) High obstacles to social mobility | 8 |
| B | (CH26) Lack of accessible leisure facilities | 7 |
| B | (CH27) Urban violence and insecurity | 5 |



| | |
|---|---|
| Smart Governance | SGo1. Participation |
| | SGo2. Transparency and information accessibility |
| | SGo3. Public and Social Services |
| | SGo5. Efficiency in municipal management |
| Smart Economy | SEc1. Innovation |
| | SEc3. Local & Global interconnectedness |
| Smart Mobility | SMo3. ICT Infrastructure |
| | SMo5. Accessibility |
| Smart Environment | SEn5. Resources management |
| Smart Living | SLi1. Tourism |
| | SLi2. Culture and leisure |
| | SLi5. Technology accessibility |
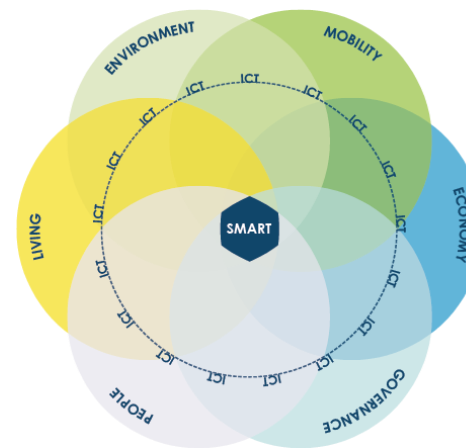
## Context & Object

| Strengths | Possible improvements |
|---|---|
| · Administrations from different levels actively participating<br>· Addresses a real problem of citizenship. (Google block). | · Apparent lack of planning in the deployment of functionalities. May lead to inefficiencies. |

**86%**

## SCP Criteria

### Innovation, Integration, Inclusion

| Strengths | Possible improvements |
|---|---|
| · Inclusive solution. Information made available for all.<br>· Integrated service for multiple municipal sections | · Open data access |

**96%**

## Quality Assessment

### Project

| Efficiency: | Sustainability & Resilience: | Quality of life: |
|---|---|---|
| 80% | 88% | |

**85%**

### Impact

| Strengths | Possible improvements |
|---|---|
| · Economic sustainability of the project | · Technologic accessibility improvement |

### PROJECT ACTIONS

| | | | Smart Governance | | | Smart Economy | | Smart Mobility | | S.Env | Smart Living | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | SGo2. | SGo3. | SGo5. | SEc1. | SEc3. | SMo3. | SMo5. | SEn5. | SLi1. | SLi2. | | |
| | | project | 8,5 | 8,5 | 8,5 | 8,5 | 8,5 | 8,5 | 8,5 | 8,5 | 8,5 | 8,5 | | |
| | | city impact | 9,3 | ## | 8,0 | 8,5 | 8,6 | 9,0 | 8,0 | 6,0 | 9,7 | 7,0 | | |
| | | max. value | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | | |
| | REF. VALUE | Assessment Value / Local government value | 8,9 | 9,3 | 8,3 | 8,5 | 8,5 | 8,8 | 8,3 | 7,3 | 9,1 | 7,8 | Value per challenge | Max Value / Challenge |
| A | CH1 | 8 | 0 | 0 | 66 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 66 | 80 |
| A | CH2 | 6 | 0 | 56 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 56 | 60 |
| B | CH3 | 7 | 0 | 0 | 58 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 58 | 70 |
| B | CH4 | 7 | 62 | 65 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 54 | 181 | 210 |
| A | CH5 | 6 | 54 | 0 | 50 | 0 | 51 | 0 | 0 | 0 | 0 | 0 | 154 | 180 |
| B | CH6 | 6 | 54 | 0 | 0 | 0 | 51 | 0 | 0 | 44 | 0 | 0 | 148 | 180 |
| B | CH7 | 4 | 36 | 0 | 0 | 0 | 34 | 35 | 0 | 0 | 0 | 0 | 105 | 120 |
| A | CH8 | 3 | 27 | 28 | 0 | 0 | 0 | 26 | 25 | 22 | 0 | 23 | 151 | 180 |
| A | CH9 | 7 | 0 | 0 | 58 | 0 | 0 | 60 | 61 | 58 | 51 | 0 | 287 | 350 |
| A | CH10 | 7 | 0 | 0 | 0 | 0 | 0 | 60 | 61 | 0 | 51 | 0 | 172 | 210 |
| B | CH11 | 10 | 0 | 0 | 0 | 85 | 85 | 88 | 0 | 0 | 0 | 0 | 258 | 300 |
| B | CH12 | 6 | 0 | 0 | 50 | 51 | 51 | 53 | 0 | 44 | 55 | 0 | 302 | 360 |
| B | CH13 | 7 | 0 | 0 | 0 | 60 | 0 | 0 | 0 | 0 | 64 | 54 | 177 | 210 |
| B | CH14 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| A | CH15 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 74 | 0 | 0 | 0 | 74 | 90 |
| A | CH16 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 74 | 0 | 0 | 0 | 74 | 90 |
| A | CH17 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 41 | 36 | 0 | 0 | 78 | 100 |
| A | CH18 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 73 | 0 | 0 | 73 | 100 |
| A | CH19 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| A | CH20 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 51 | 0 | 0 | 51 | 70 |
| B | CH21 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 58 | 51 | 0 | 0 | 109 | 140 |
| A | CH22 | 2 | 18 | 19 | 0 | 0 | 0 | 18 | 17 | 15 | 18 | 16 | 119 | 140 |
| B | CH23 | 5 | 0 | 0 | 0 | 43 | 0 | 0 | 0 | 0 | 45 | 39 | 127 | 150 |
| A | CH24 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 8 | 16 | 20 |
| B | CH25 | 8 | 71 | 74 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 62 | 207 | 240 |
| B | CH26 | 7 | 0 | 65 | 0 | 0 | 0 | 0 | 0 | 58 | 0 | 54 | 177 | 210 |
| B | CH27 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 41 | 0 | 0 | 41 | 50 |
| | Value per project action | | 321 | 305 | 281 | 196 | 435 | 341 | 454 | 435 | 182 | 310 | 3259 | ASSESSMENT |
| | max value/project action | | 800 | 800 | 600 | 300 | 1000 | 700 | 1200 | 1100 | 400 | 800 | Good | BANKABILITY |
| | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 70 | FINAL RESULT |

## Results: 3.259   70% / Suitable for Financing

## New Urban development in TAPARURA — Sfax, Tunisia

### Description

Taparura is a new urban development project whose main guideline is sustainability. The project moves in many areas, such as public spaces, public transport system and the littoral, increasing its interest to tourism. Moreover, it promotes green modes of transport through many initiatives as cycle paths and reducing energy and water consumption by using more efficient materials in construction. This development aims at incrementing quality of life and creating friendly spaces, making Sfax more valuable.

### Context

#### Region
(Grand Sfax)

**Population**: 608.666
**% total population of country:** 5,5 %
**GDP per capita:** n.a.
**% GDP per inhabitant:** n.a.
**Poverty rate:** 5,4 %
**Employment rate:** 40,6 %
**Unemployment rate:** 8,5%
**Urbanization rate:** n.a.
**Annual population change:** 1, 75 %

#### City
(Sfax)

**Population:** 101.176
**% Population of the region:** 15,54 %
**Density:** 4307 hab/km²
**Annual population change:** 5,5 %

#### ICT (National level)

**ICT Development Index:** 4,73 (2015)
**Internet Users:** 48,1 %

| REF. VALUE | CHALLENGES | Local gov. value |
|---|---|---|
| A | (CH1) Low urban institutional capacities | 6 |
| A | (CH2) Deficit of social services | 8 |
| B | (CH3) Instability in governance | 8 |
| B | (CH4) Gap between government and governed | 6 |
| A | (CH5) Excessive centralization & lack of institutional coordination | 3 |
| B | (CH6) Lack of awareness, engagement & participation | 9 |
| B | (CH7) Shortage in access to information | 2 |
| A | (CH8) Lack of equity in access to opportunities and resources | 2 |
| A | (CH9) Unbalanced geographical development | 7 |
| A | (CH10) High infrastructures deficit | 7 |
| B | (CH11) Shortage in access to technology | 2 |
| B | (CH12) Lack of competitiveness | 2 |
| B | (CH13) Lack of diversification on urban economy | 2 |
| B | (CH14) Important role of the informal economy | 8 |
| A | (CH15) Lack of accessible and affordable public transport | 9 |
| A | (CH16) Increase in private car ownership and use | 9 |
| A | (CH17) Pollution | 10 |
| A | (CH18) Very rapid urbanization | 7 |
| A | (CH19) Lack of quality on neighbourhoods and public space | 7 |
| A | (CH20) Inefficient resources cycle management | 3 |
| B | (CH21) Climate change effect | 7 |
| A | (CH22) Urban poverty and inequality | 5 |
| B | (CH23) Threats to cultural identity and particularities | 1 |
| A | (CH24) Low educational level and digital skills | 1 |
| B | (CH25) High obstacles to social mobility | 3 |
| B | (CH26) Lack of accessible leisure facilities | 2 |
| B | (CH27) Urban violence and insecurity | 6 |

| | |
|---|---|
| Smart Governance | SGo3. Public and Social Services |
| | SGo5. Efficiency in municipal management |
| Smart Economy | SEc2. Entrepreneurship |
| | SEc3. Local & Global interconnectedness |
| Smart Mobility | SMo2. Public Transport |
| | SMo5. Accessibility |
| | SMo6. Clean, non-motorised option |
| | SMo7. Multimodality |
| Smart Environment | SEn2. Energy efficiency |
| | SEn3. Urban planning and urban refurbishment |
| | SEn4. Smart buildings and building renovation |
| | SEn5. Resources management |
| Smart Living | SLi1. Tourism |

## Context & Object

**Strengths**
- Institutional and strategic planning.
- Identification of need.

**Possible improvements**
- Some important challenges not addressed.

**87%**

## SCP Criteria

### Innovation, Integration, Inclusion

**Strengths**
- Integration of participant organizations and stakeholders.

**Possible improvements**
- Technology inclusion in the plans.
- More transparency.

**70%**

## Quality Assessment

### Project

| Efficiency: | Sustainability & Resilience: | Quality of life: |
|---|---|---|
| 90% | 78% | |

**82%**

### Impact

**Strengths**
- Energy efficiency and clean mobility.

**Possible improvements**
- Improve impact on CH17

### PROJECT ACTIONS

| | | | Smart Gov. | | Smart Economy | | Smart Mobility | | | | Smart Environment | | | | Smart Liv. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | SGo3. | SGo5. | SEc2. | SEc3. | SMo2. | SMo5. | SMo6. | SMo7. | SEn2. | SEn3. | SEn4. | SEn5. | SLi1. | | |
| | project | | 8,2 | 8,2 | 8,2 | 8,2 | 8,2 | 8,2 | 8,2 | 8,2 | 8,2 | 8,2 | 8,2 | 8,2 | 8,2 | | |
| | city impact | | 7,0 | 6,5 | 8,0 | 8,0 | 9,3 | 9,0 | 9,5 | 8,7 | 9,0 | 9,0 | 8,6 | 9,3 | 7,2 | | |
| | max. value | | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | | |
| REF. VALUE | Assessment Value / Local government value | | 7,6 | 7,3 | 8,1 | 8,1 | 8,8 | 8,6 | 8,8 | 8,4 | 8,6 | 8,6 | 8,4 | 8,8 | 7,7 | Value per challenge | Max Value / Challenge |
| A | CH1 | 6 | 0 | 44 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 44 | 60 |
| A | CH2 | 8 | 61 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 69 | 0 | 0 | 0 | 130 | 160 |
| B | CH3 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| B | CH4 | 6 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 60 |
| A | CH5 | 3 | 0 | 22 | 0 | 24 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 46 | 60 |
| B | CH6 | 9 | 0 | 0 | 73 | 73 | 0 | 0 | 0 | 0 | 77 | 0 | 75 | 79 | 0 | 377 | 450 |
| B | CH7 | 2 | 0 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 20 |
| A | CH8 | 2 | 15 | 0 | 16 | 0 | 18 | 17 | 18 | 0 | 17 | 17 | 17 | 18 | 0 | 152 | 180 |
| A | CH9 | 7 | 0 | 51 | 0 | 57 | 61 | 60 | 62 | 59 | 0 | 60 | 0 | 61 | 0 | 472 | 560 |
| A | CH10 | 7 | 0 | 0 | 0 | 57 | 61 | 0 | 62 | 59 | 0 | 60 | 0 | 61 | 0 | 360 | 420 |
| A | CH11 | 2 | 0 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 20 |
| B | CH12 | 2 | 0 | 15 | 16 | 16 | 0 | 0 | 0 | 0 | 17 | 0 | 0 | 18 | 15 | 97 | 120 |
| B | CH13 | 2 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 32 | 40 |
| B | CH14 | 8 | 0 | 0 | 65 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 65 | 80 |
| A | CH15 | 9 | 0 | 0 | 0 | 0 | 79 | 77 | 80 | 76 | 0 | 77 | 0 | 0 | 0 | 389 | 450 |
| A | CH16 | 9 | 0 | 0 | 0 | 0 | 79 | 77 | 80 | 76 | 0 | 77 | 0 | 79 | 0 | 468 | 540 |
| A | CH17 | 10 | 0 | 0 | 0 | 81 | 88 | 86 | 88 | 84 | 86 | | | 88 | 0 | 601 | 900 |
| A | CH18 | 7 | 53 | 51 | 0 | 57 | 0 | 60 | 62 | 0 | 0 | 60 | 59 | 61 | 0 | 464 | 560 |
| A | CH19 | 7 | 53 | 0 | 0 | 0 | 61 | 60 | 62 | 59 | 0 | 60 | 59 | 0 | 0 | 414 | 490 |
| A | CH20 | 3 | 0 | 0 | 0 | 0 | 26 | 0 | 27 | 25 | 26 | 0 | 25 | 26 | 0 | 155 | 180 |
| B | CH21 | 7 | 0 | 0 | 0 | 0 | 61 | 60 | 62 | 59 | 60 | 60 | 59 | 61 | 0 | 483 | 560 |
| A | CH22 | 5 | 38 | 0 | 40 | 0 | 44 | 43 | 44 | 42 | 0 | 43 | 42 | 44 | 38 | 419 | 500 |
| B | CH23 | 1 | 0 | 0 | 8 | 8 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 8 | 32 | 40 |
| A | CH24 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 |
| B | CH25 | 3 | 0 | 0 | 24 | 0 | 0 | 0 | 0 | 0 | 0 | 26 | 25 | 0 | 0 | 75 | 90 |
| B | CH26 | 2 | 15 | 0 | 0 | 0 | 18 | 17 | 18 | 17 | 0 | 17 | 17 | 0 | 0 | 118 | 140 |
| B | CH27 | 6 | 0 | 0 | 0 | 0 | 0 | 52 | 0 | 0 | 0 | 52 | 0 | 0 | 0 | 103 | 120 |
| Value per project action | | | 236 | 184 | 259 | 405 | 596 | 610 | 664 | 556 | 284 | 688 | 377 | 596 | 77 | 5531 | ASSESSMENT |
| max value/project action | | | 700 | 500 | 800 | 1000 | 1100 | 1200 | 1200 | 1000 | 600 | 1500 | 1000 | 1100 | 400 | Good | BANKABILITY |
| | | | | | | | | | | | | | | | | 81 | RESULT |

## Results:  5.531   81%  / Suitable for financing

## 5.2.4. CASE STUDY 4: E-VEHICLE PILOT; AMMAN, JORDAN

**e-vehicle initiative**      **Amman, Jordan**

### Description



The project is part of the Amman Smart City initiative. It will enable 10 charging stations free of charge, that will also serve 250 EVs that will be deployed by GAM replacing the same number of regular fuel-powered vehicles (150 cars of GAM's fleet, and 100 cars of municipal Al Mummayyaz taxi fleet). The project will showcase and promote the use of EVs.

### Context

**Region**
(Amman)

**Population**: 4.000.000
**GDP per capita:** 527,918 €
**Poverty rate: 18 % (West Bank)**
**Employment rate:** 80,3 %
**Unemployment rate:** 19,7%
**Annual population change:** 2,83 %
*Currency rate: 1€=1,07155 $

**City**
(Amman)

**Population:** 70.000
**Density:** 3684 hab/km²
**Annual population change:** 2,83%
**GDP per capita:** 2.117,8 €
*Currency rate: 1€=1,07155 $

**ICT (National level)**

**ICT Development Index:** 4,16 (2013)
**Internet Users:** 57,7 %

| REF. VALUE | CHALLENGES | Local gov. value |
|---|---|---|
| A | (CH1) Low urban institutional capacities | 7 |
| A | (CH2) Deficit of social services | 6 |
| B | (CH3) Instability in governance | 3 |
| B | (CH4) Gap between government and governed | 8 |
| A | (CH5) Excessive centralization & lack of institutional coordination | 8 |
| B | (CH6) Lack of awareness, engagement & participation | 7 |
| B | (CH7) Shortage in access to information | 8 |
| A | (CH8) Lack of equity in access to opportunities and resources | 4 |
| A | (CH9) Unbalanced geographical development | 7 |
| A | (CH10) High infrastructures deficit | 7 |
| B | (CH11) Shortage in access to technology | 4 |
| B | (CH12) Lack of competitiveness | 6 |
| B | (CH13) Lack of diversification on urban economy | 8 |
| B | (CH14) Important role of the informal economy | 3 |
| A | (CH15) Lack of accessible and affordable public transport | 9 |
| A | (CH16) Increase in private car ownership and use | 9 |
| A | (CH17) Pollution | 5 |
| A | (CH18) Very rapid urbanization | 10 |
| A | (CH19) Lack of quality on neighbourhoods and public space | 8 |
| A | (CH20) Unneficient resources cycle management | 8 |
| B | (CH21) Climate change effect | 7 |
| A | (CH22) Urban poverty and inequality | 7 |
| B | (CH23) Threats to cultural identity and particularities | 6 |
| A | (CH24) Low educational level and digital skills | 3 |
| B | (CH25) High obstacles to social mobility | 7 |
| B | (CH26) Lack of accessible leisure facilities | 7 |
| B | (CH27) Urban violence and insecurity | 3 |



| | |
|---|---|
| **Smart Mobility** | SMo2. Public Transport |
| | SMo6. Clean and non-motorized options |
| **Smart Environment** | SEn2. Energy Efficiency |
| | SEn5. Awareness Rising and behavioral change |
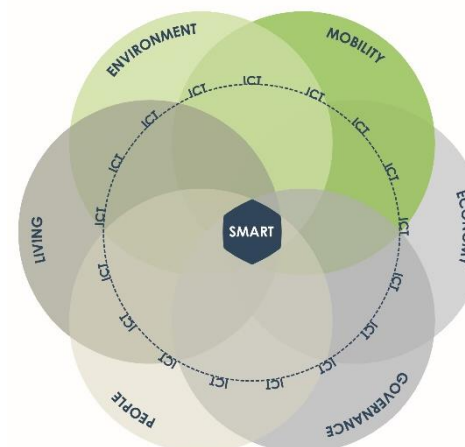
## Context & Object

| Strengths | Possible improvements |
|---|---|
| · Improves the resource management of municipal Gov.<br>· All administrations coordinated. | · Competition<br>· Transparency in management |

**60%**

## SCP Criteria

### Innovation, Integration, Inclusion

| Strengths | Possible improvements |
|---|---|
| · Sustainable system<br>· Resilient mobility service provision | · Enforcement of inclusion of all citizenship<br>· Avoid Silo approach |

**76%**

## Quality Assessment

### Project

| Efficiency: | Sustainability & Resilience: | Quality of life: |
|---|---|---|
| 78% | 78% | |

**78%**

### Impact

| Strengths | Possible improvements |
|---|---|

| | | | P. ACTIONS | | | | |
|---|---|---|---|---|---|---|---|
| | | | S.MOB | | S.ENV | | |
| | | | SMo2 | SMo6 | SEn2 | SEn7 | |
| | project | | 7,77 | 7,77 | 7,77 | 7,77 | |
| | city impact | | 7,50 | 8,67 | 8,00 | 8,00 | |
| | max. value | | 10 | 10 | 10 | 10 | |
| REFERENCE VALUE | Assessment Value / Local government value | | 7,64 | 8,22 | 7,89 | 7,89 | Value per challenge | Max Value / Challenge |
| A | CH1 | 7 | 0 | 0 | 0 | 55 | 55 | 70 |
| A | CH2 | 6 | 0 | 0 | 0 | 0 | 0 | 0 |
| B | CH3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| B | CH4 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| A | CH5 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| B | CH6 | 7 | 0 | 0 | 55 | 0 | 55 | 70 |
| B | CH7 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| A | CH8 | 4 | 31 | 33 | 32 | 32 | 127 | 160 |
| A | CH9 | 7 | 53 | 58 | 0 | 55 | 166 | 210 |
| A | CH10 | 7 | 53 | 58 | 0 | 55 | 166 | 210 |
| B | CH11 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| B | CH12 | 6 | 0 | 0 | 47 | 0 | 47 | 60 |
| B | CH13 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| B | CH14 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| A | CH15 | 9 | 69 | 74 | 0 | 0 | 143 | 180 |
| A | CH16 | 9 | 69 | 74 | 0 | 71 | 214 | 270 |
| A | CH17 | 5 | 38 | 41 | 39 | 39 | 158 | 200 |
| A | CH18 | 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| A | CH19 | 8 | 61 | 66 | 0 | 63 | 190 | 240 |
| A | CH20 | 8 | 61 | 66 | 63 | 63 | 253 | 320 |
| B | CH21 | 7 | 53 | 58 | 55 | 55 | 221 | 280 |
| A | CH22 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| B | CH23 | 6 | 0 | 0 | 0 | 0 | 0 | 0 |
| A | CH24 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| B | CH25 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| B | CH26 | 7 | 53 | 58 | 0 | 0 | 111 | 140 |
| B | CH27 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Value per project action | | 542 | 584 | 292 | 489 | 1907 | ASSESSMENT RESULT |
| | max value/project action | | 1100 | 1100 | 600 | 1100 | Poor | BANKABILITY |
| | | | 1 | 1 | 1 | 1 | 71 | FINAL RESULT |

CHALLENGES

## Result:  1.907   71%  / Suitable for financing

# 6. GOVERNANCE OF SMART CITY PROJECTS IN THE MEDITERRANEAN REGION

## 6.1. STAGES

Governance plays a key role to reach success in the development of Smart City Projects and Initiatives. The three years experience of the ASCIMER project have led to the development of a framework of Governance Know-how. It has been developed in order to organize the knowledge gathered and to extract useful conclusions for stakeholders involved in the process of developing projects in smart cities.
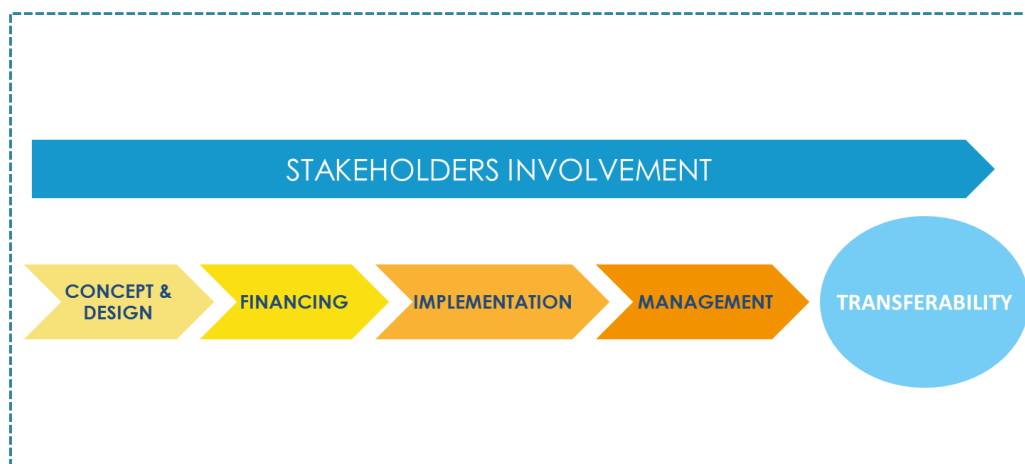
### Governance know-how



*Figure 12: Governance framework and stages of Smart City Projects Development.*

These Governance know-how framework divides the development process in 4+1 steps:

1. **Concept & Design.** Is the first step of the process, and as the departure point all the following steps must be included in the design perspective

2. **Financing.** It is key for the project to get adequate funding regarding the objectives it pursues.

3. **Implementation.** Is the core of the development of the project, where the concept is transformed into a reality.

4. **Management.** Once the project has been implemented, it has to be put into operation and management becomes them the key for assuring its correct functioning.

   -Finally, the **transferability** phase is a future step that takes place in order to develop new projects in new contexts and with new objectives.

Across all these steps, stakeholders' involvement is key for good governance and a special attention will be paid to this aspect along the description of guidelines.

## 6.2. STAKEHOLDERS INVOLVED

The identification of stakeholders is key for understanding their role in the Smart City. For this purpose, a Conceptual Model has been developed in order to show in a comprehensive Diagram how does a Smart City work. In this stage of the process it is key to understand the place that stakeholders must have in this model and what are their roles in the Smart City. For this purpose, a conceptual model has been developed in order to explain the role and relationships of different groups of stakeholders.

### a) Internal stakeholders

Stakeholders have been placed at the core of the model. Among them, **Citizens** have been represented as the very core of the Smart City. Their demands can be expressed directly or through the **internal stakeholders**, different groups of stakeholders that are interacting inside the Smart City.
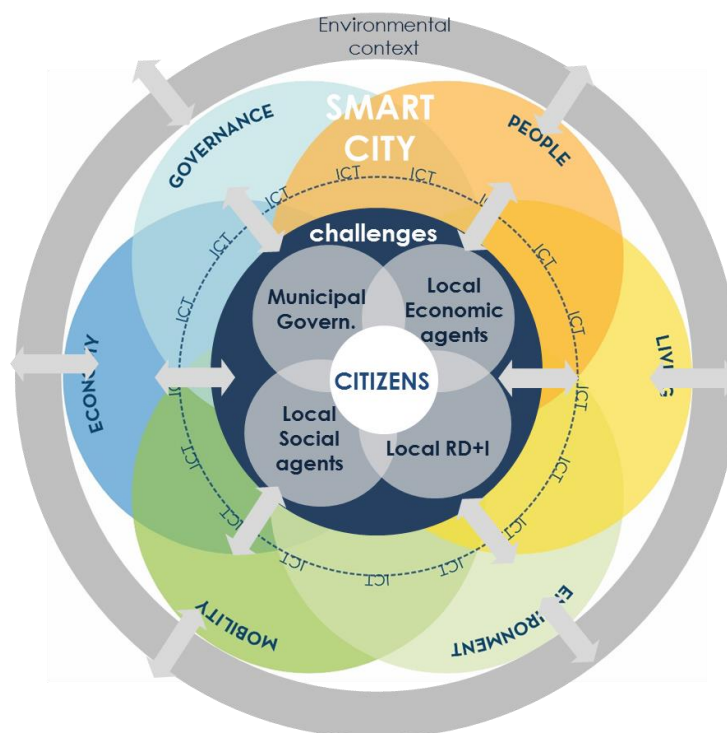


*Figure 133: Internal stakeholders performing in the Smart City*

The different groups identified have been the following:

-**Municipal Government:** conformed by the local politicians and public servants working for the city.

-**Local Economic agents:** which includes all private companies of different sizes that operate at a city level (from the small shop to the big company located in the city).

-**Local Social agents:** in this group all local organizations (ONGs, CBOs, neighborhoods' associations, etc) are included.

-**Local RD+I.** All research groups from social researchers to universities, including also research department in companies, play a key role in the Smart City fostering innovation.

All this groups are represented as over-posed, as one person is, first of all a Citizen, and besides can belong to one or more of the other groups.

The **challenges** described at the beginning of this document are posed by all these stakeholders groups. The Smart City appears as an answer to the challenges posed by the stakeholders. In this diagram the **Smart City** is represented again by the interaction of the different dimensions of **Governance, Economy, Environment, Mobility, People and Living.**

**b) External stakeholders**

Stakeholders inside the city are not the only ones to be taken into account. There are **external stakeholders**, groups at another scales outside the city that are key for the development of the Smart City.
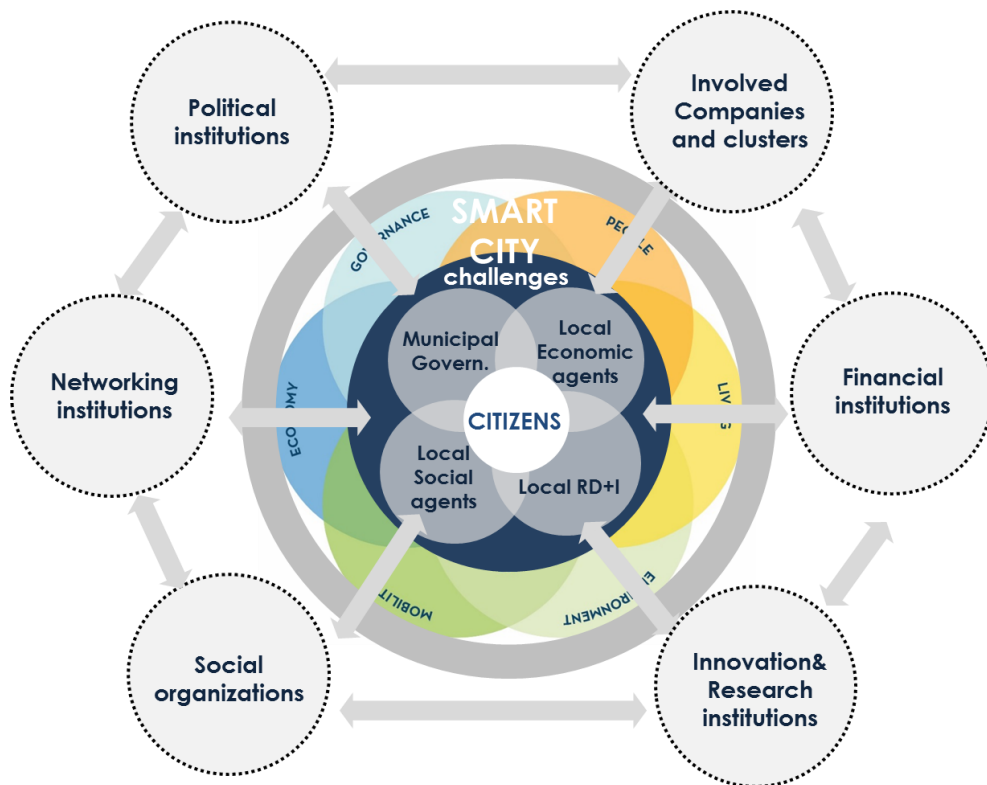


*Figure 144: Internal and External Stakeholders in a Smart City*

The groups included in this diagram are:

-**Political Institutions:** in the framework of the Mediterranean Region, the most important political institutions to be taken into account are the ones of the Central Government. However, other institutions like the European Union or the United Nations can also play an important role in the development of the Smart City by producing guidelines and recommendations, and also by means of cooperation.

**-Networking institutions**: institutions that are dedicated to international relationships among National Governments and local governments. Examples in the Region would be Union for the Mediterranean and Medcities.

**-Social Organizations:** International Social Organizations can play a key role in the development of the social aspects of the Smart Cities. International NGOs like the Red Cross work at an urban level and can be involved in the processes that lead to a Smart City.

**-Innovation and Research institutions:** Universities and research centers that are working at an international level can play a role in the development of Smart Cities in the Region and the transferability of knowledge. For example, this work has been developed by the Transport Research Centre of Universidad Politécnica de Madrid and has involved members from Lebanon National University, Hassan I University, Politecnico di Milano, Vienna Technical University, Lyon University, etc.

**-Financial Institutions:** obtaining funding is key for the development of Smart City Projects, Therefore, it is important to take into account the involvement of financial institutions at National or International level (like the European Investment Bank, the World Bank or the French Cooperation Agency).

**-Involved companies and clusters:** At a national or international level, the role of big companies (IBM, Cisco, etc.) and of clusters (like e-Madina Cluster in Morocco) must be taken into account. Also their interactions with the local entrepreneurial tissue and the approach of fair completion are going to be topics to be taken into account according to these stakeholders groups.

**c) Relationships among smart cities**
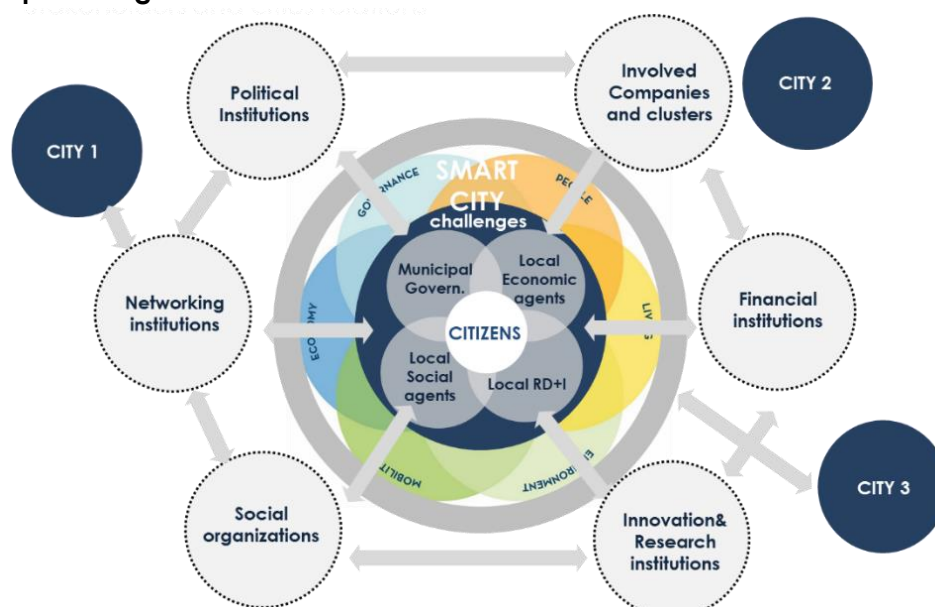


*Figure 15: Relationships among Smart cities and possible roles of stakeholders as intermediaries*

Finally, the City can stablish **relationships with other cities** in order to collaborate and for transferability of projects. These relationships can be developed directly or through the different stakeholders and institutions operating at national or international level.

The importance of the different stakeholders groups in each of the governance stages has been evaluated by a qualitative survey done among the participants in the 3rd ASCIMER workshop "Governance of Smart City Projects in the Mediterranean". The results offer

| | Citizens | Municipal Government | Political Institutions | Involved Companies and Clusters | Financial Institutions | Innovation &Research Institutions | Social Organizations | Networking Institutions |
|---|---|---|---|---|---|---|---|---|
| **CONCEPT & DESIGN** | 3,76 | 4,79 | 3,93 | 2,93 | 3,34 | 3,83 | 3,9 | 3,45 |
| **FINANCING** | 1,66 | 3,97 | 3,76 | 3,24 | 4,83 | 1,72 | 1,69 | 2,1 |
| **IMPLEMENTATION** | 2,76 | 4,31 | 2,72 | 4,03 | 3,1 | 2,41 | 2,48 | 2,21 |
| **MANAGEMENT** | 2,69 | 4,17 | 2,38 | 3,24 | 2,31 | 2,24 | 2,38 | 2,07 |
| **TRANSFERABILITY** | 2,46 | 3,14 | 3,17 | 3,21 | 3,14 | 3,59 | 2,55 | 3,52 |

*Table 13. Stakeholders' importance at each governance stage: average values (scale 1-5)*

## 6.3. RECOMMENDATIONS FOR BETTER GOVERNANCE

The recommendations for the development of Smart City projects could be summarized in 9 key guidelines. These guidelines will serve as a reference though the different steps in order to provide a useful structure for the use of this guide.

1. **Stakeholders' involvement & tasks definition**. Stakeholders should be involved in every step of the process and their tasks should be clearly defined.

2. **Multilevel governance**. It is important to take into account the different levels and scales of stakeholders, tools and projects and the relationships stablished among them.

3. **Citizenship involvement & social inclusion**. Among the stakeholders, Citizenship play a key role in Smart City Projects development, and social inclusion becomes therefore a key objective.

4. **Monitoring & adaptive management**. It is necessary to track the results of the project during its development and to propose changes in the process regarding the results and risks.

5. **Innovation & technology**. Innovation can be included in the different steps as new approaches and tools, including technology when necessary.

6. **Externalities & mediation**. When developing a project it is important to take into account the possible externalities of the project and mediate among the different stakeholders involved,

7. **Capacity building & knowledge transferability**. The development of new skills among the different stakeholders is key for the success of the project. Transference of knowledge among participants in different projects and among experts belonging to different areas becomes a key instrument for the development of the project.

8. **Image, credibility & positioning**. Smart city Projects are developed in a city and affects it image and credibility, and can lead to changes in their positioning in international benchmarking. This factor is also key for the development of new projects (i.e. it can make easier the recalling funding) as well as for transferability.

9. **Sustainability & efficiency**. Sustainability aspects must be taken into account in the whole development process of a Smart City Project. Social, economic and environmental aspects must be taken into account, as well as a long-term vision to make it sustainable in time. Efficiency in getting the objectives with the adequate resources is key for reaching this sustainable approach.

A synthesis of the recommendations guidelines is presented in table.

| | 1. Stakeholders involvement & tasks definition | 2. Citizenship involvement & social inclusion | 3. Multilevel governance & legal frameworks | 4. Sustainability & efficiency | 5. Externalities & mediation | 6. Monitoring & adaptive management | 7. Innovation & technology | 8. Capacity building & knowledge transferability | 9. Image, credibility & positioning |
|---|---|---|---|---|---|---|---|---|---|
| **Concept & Design** | -Joint Design<br>-Shared vision<br>-Political will<br>-Leadership | -Participation<br>-Social needs driven initiatives<br>-Temporality | -Considering existing legislation<br>-Strategic plans | -Viability<br>-Sustainability<br>-Efficiency and profitability<br>-Bankability | -Balancing-mediation<br>-Considering externalities | -Addressing challenges<br>-Clear objectives<br>-Evaluation criteria<br>-Iterative design process | -Not technology/ private interests driven<br>-innovative concept | -Taking into account previous experiences | -Considering previous/future image |
| **Financing** | -Institutional support | -Transparency<br>-Citizenship involvement | -Adequacy of scale<br>-National government commitment | -Financial sustainability | -Externalities in financing | -Risks management | -New financing models<br>-New participative financing instruments | -Capacity building in financing<br>-Knowledge in getting financing | -Cities financial credibility<br>-Project attractiveness |
| **Implementation** | -Responsibility definition<br>-Leadership<br>-Procurement | -Continuous process | -Creating ad-hoc or local development companies<br>-Legal framework | -Fair competition/ fostering local development | -Externalities that result from implementation | -Monitoring the implementation<br>-Risk management and contingency | -Innovation in implementation<br>-IT tools for awareness and transparency | -Transference of knowledge in implementation | *-Not considered as key at this stage* |
| **Management** | -Role of city manager<br>-Coordination framework<br>-Return to local authorities | -Information and awareness<br>-Feedback process<br>-Shared management | -Creating ad-hoc or local development companies<br>-Legal framework | -Linking this phase to the other project phases | *-Not considered as key at this stage* | -Continuous update<br>-Adaptive management<br>-Monitoring<br>-Procurement | -Risk solutions through research<br>-New financial models | -Capacity building in management | -Benchmarking role |
| **Transferability** | -Political institutions engagement<br>-Dialogue among cities<br>-role of specific networking initiatives | -Making the experience "cool" | *-Not considered as key at this stage* | -Sustainability in time and durability<br>-adaptation to local conditions<br>-Directions of transferability | -Information about externalities and how are they solved | -History registration<br>-Results research<br>-Evaluation | -Research and innovation dissemination | -Knowledge transference through networking<br>-Repetition factor<br>-Transferability of the financing experience | -Marketing (Benchmarking)<br>-Transparency, accessibility and dissemination of information |

*Table 14: Summary of recommendations for better governance*

# 7. CONCLUSIONS

The 3 years duration of ASCIMER project led to a comprehensive and innovative approach to Smart City Projects, summarized in this document.

First of all, it adopted a comprehensive and integrative approach to the Smart City, that synthetizes the most relevant scientific literature on the topic as well as the point of view of European institutions. It combines sustainability, efficiency and quality of life, understanding technology as a tool. Therefore, Smart Cities themselves are understood as a tool to face urban challenges, and this approach became a backbone for the development of ASCIMER project. The ASCIMER definition reflects the importance of stakeholders' involvement, highlighting the key role to municipalities.

Moreover, ASCIMER also provided a clear definition for the concept of Smart City project, which has not yet been explored in literature. Furthermore, it has followed the approach of the EIB leading to the definitions three main characteristics of Smart City projects: innovative, inclusive and integrative.

ASCIMER used a holistic framework to overcome the sectorized approach to Smart City, understanding that a project becomes smarter when it combines a higher number of dimensions of Smart Cities. The dimensions taken into consideration during the whole project have been the ones most frequently used by both scientists and practitioners: governance, economy, mobility, environment people and living. The approach to thee Smart City Projects was supported by an intensive research on best practices on the topic (see annex 1) that led to the development of a complete taxonomy. This taxonomy aims to be a tool for understanding the possibilities for action in the field of Smart Cities.

This strong theoretical background led to the development of the ASCIMER assessment methodology for Smart City Projects. This methodology takes as a departure point the importance of understanding the Smart City Projects as a tool to face urban challenges. Urban challenges are specific for each city and usually common problems must be addressed by cities belonging to the same Region.

The methodology is organized in five blocks that are related to the conceptual background of the project. In the first stage, methodology took as a departure point the classification according to the developed taxonomy, as well as the importance of the contextual framework. In a second step, the fulfillment of the Smart City Project characteristics is evaluated. The third step evaluates through the use of indicators the characteristics and impacts on the objectives stablished in the ASCIMER Smart City definition (sustainability, efficiency and quality of life). In the fourth stage, the results of the previous stage are weighted according to the specific challenges of the city. Finally, the bankability is evaluated according to the EIB criteria.In conclusion, the strength of the ASCIMER methodology is based on its strong background on theoretical and practical research.

Another strength of the ASCIMER project has been the involvement of experts in the region. The different steps of the methodology were discussed and validated by relevant stakeholders in the field. Therefore, their role have been crucial for the development of the ASCIMER methodology.

The validation of the ASICMER methodology has taken place through its application to the South and East-Mediterranean Region. On a first step, a framework for the development of Smart City Projects in the selected Region was developed. The challenges for cities in the area have been described and classified in 6 dimensions: governance, economy, mobility, environment, people

and living. Governance is the dimension that presents a higher number of identified challenges. The challenges have been weighted by a survey among relevant stakeholders, becoming an input for the methodology. Most of the challenges related to governance are among the ones rated as the most important in the developed survey, showing the importance of governance topics in the region. The last step of the validation of the methodology has taken place through the evaluation of a selection of real projects in the South and East-Mediterranean Region. This validation has showed interesting results about the characteristics of the projects and the requirements for Smart City Projects to be financed.

Finally, the governance framework has been identified as key for the success of the implementation of Smart City projects. A model for understanding this framework has been developed. The importance of the different stakeholders in the different steps have been evaluated by members of municipalities and national and international organizations. Municipal Governments are considered to be the most important stakeholders in most of the stages, followed by involved companies and clusters and financial institutions. Furthermore, recommendations of the experienced stakeholders in the field have been gathered in order to provide a support for the future Smart City Projects.

The combination between theoretical and practical backgrounds during the development of the ASCIMER project has been key for its success. All the different steps have combined both approaches, resulting in a project with a strong scientific support, but also linked to reality.

Smart City Projects in the Mediterranean Region need to become a tool for urbanization that has quality of life and equity as the main goals. This tool needs to be holistic and articulated to increase its efficiency. Governance groups both the challenges and the way to manage this tool in order to reach the defined goals. A holistic approach is needed in the different stages of the development of the project, which present transversal issues that need to be taken into account.

## 8. REFERENCES

1. Anthopoulos, L., & Fitsilis, P. (2010). From digital to ubiquitous cities: Defining a common architecture for urban development. *In Proceedings of the 6th International Conference on Intelligent Environments*, Kuala Lumpur, Malaysia, July 19-21.

2. Arribas-Bel, D.; Kourtit, K. y Nijkamp, P. (2013) Benchmarking of World Cities through self organizing Maps. Cities. 2013 vol.31. pp. 248-257.

3. Batty, M. et al. (2012) *Smart Cities of the future*. UCL Working Paper Series, Paper 188. ISSN 1467-1298

4. Boulton, A., Brunn, S. D., & Devriendt, L. (2011). *Cyberinfrastructures and "smart" world cities: Physical, human, and soft infrastructures*. International Handbook of Globalization and World Cities. Cheltenham, U.K.: Edward Elgar.

5. Caragliu, A.; del Bo, C.; Nijkamp, P. (2009) Smart cities in Europe. *3rd Central European Conference in Regional Science – CERS*, 2009

6. Caragliu, a. y DelBo, C. (2012) Smartness in European urban performance: assesing local impacts of smart urban atributes. Innovation: The European journal of Social Science Research. Vol 25 (2) pp. 97-133-

7. Cascajo Jiménez, R. (2004). Metodología de evaluación de efectos económicos, sociales y ambientales de proyectos de transporte guiado en ciudades. Tesis doctoral. Universidad Politécnica de Madrid.

8. Chourabi, H. et al. (2012) Understanding Smart Cities: An Integrative Framework. *45th Hawaii International Conference on System Sciences*

9. Cohen, B. (2012) *What Exactly Is A Smart City?* www.fastcompany.com, September 19, 2012

10. Correia, L.M. (2011) *Smart Cities Applications and Requirements, White Paper*. Net!Works European Technology Platform

11. De Santis, R.; Fasano, A.; Mignolli,N. y Villa, A. (2014) Smart city. fact and fiction. MPRA Paper No. 54536. Munich, Alemania.

12. Edvinsson, L. (2006). Aspects on the city as a knowledge tool. *Journal of Knowledge Management*, 10(5), 6-13.EU (2012) *JESSICA for Smart and Sustainable Cities*. Horizontal Study, final report.

13. EU, (2011) *Cities of tomorrow. Challenges, visions, ways forward*. European Commission, Directorate General for Regional Policy

14. EU(2014) *Mapping Smart Cities in the EU*. European Parliament. Directorate General For Internal Policies. Policy Department A: Economic And Scientific Policy.

15. Giffinger, R. et al. (2007) *Smart Cities: Ranking of European Medium-Sized Cities*. Vienna, Austria: Centre of Regional Science (SRF), Vienna University of Technology.

16. Hall, R.E. (2000) The vision of a smart city. *2nd international Life Extension Technology Workshop*. Paris, France. September 28, 2000.

17. Harrison, C. et al. (2010) Foundations for Smarter Cities. *IBM Journal of Research and Development*, 54(4)

18. Hernández Aja, A (2009) Calidad de vida y medio ambiente urbano. Indicadores locales de sostenibilidad y calidad de vida urbana. Revista Invi Nº 65 / May 2009 / Volume Nº 24: 79-111

19. ISO (2014) *Sustainable development of communities -- Indicators for city services and quality of life. ISO 37120:2014.*

20. Klein, C. & Kaefer, G. (2008) From Smart Homes to Smart Cities: Opportunities and Challenges from an Industrial Perspective. *8th International Conference, NEW2AN and 1st Russian Conference on Smart Spaces, ruSMART*, 2008 St. Petersburg, Russia, September 3-5, 2008.

21. Kourtit, K.; Nijkamp, P. y Arribas, D. (2012) Smart cities in perspective – a comparative European study by means of self-organizing maps. Innovation: The European Journal of Social Science Research. Volume 25, Issue 2, 2012

22. Lazaroiu, G.C. y Roscia, M. (2012) Definition methodology for the smart cities model. Energy 47, 326e332.

23. Leydesdorff, L. y Deakin, M. (2010) The triple helix model and the meta-stabilization of urban technologies in Smart cities.

24. Malek, J. A. (2009). Informative global community development index of informative smart city. *In Proceedings of the 8th WSEAS International Conference on Education and Educational Technology* (Genova, Italy, Oct 17-19).

25. Moser, M. A. (2001). What is smart about the smart communities movement? *EJournal*, 10/11(1).

26. Nam, T. & Pardo, T.A. (2011) Conceptualizing Smart City with Dimensions of Technology, People, and Institutions. *The Proceedings of the 12th Annual International Conference on Digital Government Research*

27. Neirotti, P. (2012) Current trends in Smart City initiatives: Some stylised facts. *Cities* 38 (2014) 25–36

28. Satterthwaite, D. (1997) Sustainable Cities or Cities that Contribute to Sustainable Development? *Urban Studies.* October 1997 34: 1667-1691

29. Schaffers, H. et al. (2012) *Smart Cities as Innovation Ecosystems sustained by the future internet.* FIREBALL white paper

30. Smart Cities Council. Smart City Index Master Indicators Survey. http://smartcitiescouncil.com/resources/smart-city-index-master-indicators-survey (visited 2014-12-13)

31. UN-Habitat (2010) *The State Of African Cities 2010. Governance, Inequality and Urban Land Markets.* United Nations Human Settlements Programme

32. UN-Habitat (2014) *The State Of African Cities 2014. Re-imagining sustainable urban transitions.* United Nations Human Settlements Programme

33. United Nations, DESA, Population Division (2005). *World Urbanization Prospects: The 2005 Revision*

34. WCED (1987). *Brundtland report*

35. World Bank. Population growth Data Bank.

## ANNEXES

ANNEX 1: BEST PRACTICES

ANNEX 2: ASCIMER FIELD VISITS: LESSONS LEARNT

ANNEX 3: LIST OF PARTICIPANTS

## ANNEX 1: BEST PRACTICES

The Best Practices Guide is an information tool for cities that want to take advantage of the ICTs and solve their challenges through Smart City Projects.

The guide links city challenges with a wide range of Smart Projects designed to solve them. It is a tool for developing Smart Cities that efficiently respond to complex and diverse urban challenges without compromising their sustainable development and while improving the quality of life of their citizens.

This Best Practices Guide provides a series of matrices which serve as a tool for decision-making. These matrices relate city challenges with the specific actions designed to tackle them. Therefore, once specific city problems are identified, the guide provides information about the possible actions to take, as well as specific examples of on-going Smart City Projects that can respond to these challenges are this way localized.

As being part of the Smart City Strategy has been identified as a key element for a City Project to become Smart, some of the most outstanding Mediterranean Smart City Strategies. This part of the guide will also be expanded through the complete ASCIMER project.

Finally the last section of the guide includes a preliminary study (already presented in the ASCIMER First Workshop in July 2014) on Smart Cities in the South Mediterranean Region. This short study aims at establishing the context for the development of Smart City actions in the region and also at describing common implementation problems as well as the main types of projects already implemented.



*Figure 15: Smart City Projects' Map*

## BEST PRACTICES IN SMART CITY PROJECTS

The Best Practices Guide was developed in order to inform cities about the most suitable Smart City actions to tackle specific city challenges. Examples of real Smart City projects are also provided.

Most of the Smart City projects have a relatively short history and often the correspondence between their impacts and the real challenges in cities is not clear. Before implementing a Smart City project it is necessary understand not only the potential impacts of the project but also the priorities and specific problems that are trying to be solved

The Guide is structured by Smart City Dimensions, with an initial map that shows the name and the location of the projects already found during the research.

Then a matrix shows how these projects are linked to both European and South-East Mediterranean challenges. Besides it also specifies to what kind of Smart City Action the project belongs and which are the related city dimensions that it comprises.

Project sheets provide background information of the city where the project has been implemented and a brief description of the project itself including, when possible, the development rate and scale of the project, how it is financed, its key innovation features and its main impacts.

As a sample for this summary the matrix of relations for the Smart Environment, as well as one sample of project sheet, have been included. The remaining 21 projects analyzed, as well as the matrices for the other dimensions can be found on ASCIMER DELIVERABLE 1B: Projects catalog.

## Smart Environment Best Practices

The map shows the name and the location of the projects already found during the research. In the next page, the matrix shows how these projects are linked to both European and South-East Mediterranean challenges. Besides it also specifies to what kind of Smart City Action the project belongs and which are the related city dimensions that it comprises.

Project sheets provide background information of the city where the project has been implemented and a brief description of the project itself including, when possible, the development rate and scale of the project, how it is financed, its key innovation features and its main impacts.

| | |
|---|---|
| Mediterranean Region | 6 |
| Europe (Others) | - |
| Africa (Others) | - |
| North-America | 1 |
| South-America | - |
| Asia (Others) | - |
| Oceania | 1 |

En2a. Watt et Moi.
En3a. Lyon Smart Community
Lyon, France

En2a. Irrigestlife
Vitoria Gastreiz, Spain

En5b. LifeEWAS
Seville, Spain

En2b. Smart Grid
Malta

En5b. LifeEWAS
Chania, Greek

En2a. Renawable & Energy
law.
Jordan

| | Smart City Project Actions | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SEn1.1. Environmental monitoring | SEn1.2. Network monitoring. | SEn1.3. Applications to visualize the information collected | SEn2.1. Smart grids. | SEn2.2. Renewable energy. | SEn2.3. Energy efficiency in buildings. | SEn2.4. Energy efficiency in public devices. | SEn2.5. District energy supply options. | SEn2.6. Citizen involvement in energy efficiency measures. | SEn3.1. Urban planning in new developments. | SEn3.2. Urban Refurbishment. | SEn3.3. Urban management related to planning. | SEn3.4. Participation in urban management and planning | SEn4.1. Sustainability in new buildings. | SEn4.2. Sustainability in building renovation. | SEn4.3. Policies and systems that involve people in energy consumption and sustainability of buildings. |
| | SEn1. Network and environmental monitoring | | | SEn2. Energy efficiency | | | | | | SEn3. Urban planning and urban refurbishment | | | | SEn4. Smart buildings and building renovation | | |
| **European City Challenges** — Energy saving | | | | | | | | | | | | | | | | |
| Shrinking cities | | | | | | | | | | | | | | | | |
| Holistic environmental and energy issues | | | | | | | | | | | | | | | | |
| U. ecosystem pressure | | | | | | | | | | | | | | | | |
| Climate change effects | | | | | | | | | | | | | | | | |
| Urban sprawl | | | | | | | | | | | | | | | | |
| **South & East-Mediterranean City Challenges** — Scarcity of resources | | | | | | | | | | | | | | | | |
| Water scarcity | | | | | | | | | | | | | | | | |
| Climate change effect | | | | | | | | | | | | | | | | |
| Pollution and congestion | | | | | | | | | | | | | | | | |
| Very rapid urbanization | | | | | | | | | | | | | | | | |
| Unbalanced geographical development | | | | | | | | | | | | | | | | |
| | | | | PEn2a. Watt et Moi. Lyon France | | PEn2c. Renawable & Energy law. Jordan | | | | PEn3a. Lyon Smart Community. Lyon, France | | | | | | |
| Smart City Best Practices | | | | | | | | | | | | | | | | |

**Smart City Project Actions**

| City Challenges | | SEn5. Resources management | | | | SEn6. Environmental protection | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | SEn5.1. Waste management. | SEn5.2. Water management. | SEn5.3. Food management. | SEn5.4. Consumption patterns. | SEn6.1. Natural resources protection. | SEn6.2. | SEn6.3. Biodiversity proteccion. | SEn6.4. Awareness rising. |
| European City Challenges | Energy saving | | | | | | | | |
| | Shrinking cities | | | | | | | | |
| | Holistic approach to environmental and energy issues | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ |
| | U. ecosystem pressure | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ |
| | Climate change effects | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ |
| | Urban sprawl | | | | | ▓ | ▓ | ▓ | ▓ |
| South & East-Mediterranean City Challenges | Scarcity of resources | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ |
| | Water scarcity | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ |
| | Climate change effect | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ |
| | Pollution and congestion | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ |
| | Very rapid urbanization | | | | | ▓ | ▓ | ▓ | ▓ |
| | Unbalanced geographical development | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ |

**Smart City Best Practices**

| PEn5a. Smart Water Metering. Kalgoorlie-Boulder, Australian | Pen5c. Recover Lost Water Revenue. Olds, Canada |
|---|---|
| PEn5b. LifeEWAS. Several, Several | PEn5b. Irrigest life. Victoria-Gasteiz, Spain |

| Project name | Lyon Smart Community |
|---|---|
| Country | France |
| City | Lyon |
| Date | 2003 - 2015 |
| 1. Smart Environment | Urban planning |
| 2. Smart Environment | Smart buildings and building renovation |
| 3. Smart Mobility | Clean and non-motorized options |
| 4. Smart Environment | Energy efficiency |
| 5. Smart Environment | Network and environmental monitoring |
| Development stage | Ongoing |
| Scale | Neighbourhood |
| Budget | 50 M€ |
| Population | 500.000 |
| Surface | 4.800 Ha |
| Framework | Lyon Smart City |
| Goals | Sustainability, efficiency and quality of life |
| Financed | NEDO |
| GPD per capita | 43.000 €/hab |
| Link | http://www.grandlyon.com |

**DESCRIPTION** The initiative has an extension of 70 Ha and several components including:

- The realization of a set of positive energy buildings
- The commissioning a fleet of electric vehicles in car sharing
- Energy monitoring systems installation in homes.
- The establishment of an analysis related to the energy consumption of the entire demonstrator data including renewable energy uses, but also the climate system, etc.

**OBJECTIVE** Energy efficiency of buildings: +20%. Electric vehicle: 80% renewable energy. Energy consumption management: +10% of energy savings. "20-20-20" European objective in 2020

**METHODOLOGY** Solar energy as a clean and renewable energy with panels in buildings´ facade and roof. The car sharing is fed by the solar energy generated. Eco-renovation of buildings. For monitoring there is a platform to collects data, analyses it and simulate it.

**INNOVATION** One of the most ambitious urban holistic projects in Europe.

**IMPACTS**

- Energy consumption: Decrease 70%
- Reduction of local emissions
- Number of positive energy building: 3
- Increase of number of habitants: 15.000
- Increase of number of jobs: 27.000

**FRAMEWORK** The main economic activities in the city are Health and social services, public administration, advisory and assistance services, education and transport. Lyon has a Smart City Strategy at city level. As common ground of city data the city has a Big Data Platform.

60-80% of the city has access to broadband connections. 40-60% of the citizens are mobile internet users.

This project affects mainly to the environment. It is located in the South of the peninsula, confluence of the Rhone and the Saone rivers. It was an old historical area based on industry. The residents were 7.000 ha with the same jobs than habitants, 7.000. In Lyon, the 29% of energy consumption is carried out in buildings.

## ANNEX 2: ASCIMER FIELD VISITS: LESSONS LEARNT

During its first year, the ASCIMER project has discerned urban challenges for the North, South and East-Mediterranean regions. During its second year, the ASCIMER team has conducted a series of field trips to South and East-Mediterranean countries (Jordan, Morocco and Lebanon) with a two-fold mission in mind: first to better understand the specific challenges of each city visited and second, to get a realistic picture of the main advantages and difficulties regarding the implementation and management of Smart City Projects in every area. The overall purpose of these visits was to secure first-hand information on projects, either planned or under development, within the Smart City framework: governance, mobility, environment and energy, services, community management, economy, etc. The projects analysed have included technological innovation in a wide sense, not only relating efficiency or ICT.



**Figure 1. Smart City Projects Map.**

Accordingly, specific urban challenges have been analysed in parallel with the needs and difficulties related to the management of pilot case studies. These allowed to report on the monitoring KPIs and to select the best investment approaches adopted in a city that aims to become a Smart City.

Regarding projects implementation, the ASCIMER team has identified Municipal Governments and their different departments as key actors: Transport, ITC e-administration, e-services, citizen card, GIS, Open Data, Investment Department of Waters, Urban Planning, Educational Facilities and so on. Besides, and considering the strong centralization of the countries visited, the central government and some of its ministries such as the Ministry of Information and Communication Technology, Urban Planning and Cities, Environment, Energy, Investments, Tourism, Health, Education, etc. are also important.

In addition to these organizations, and given that the skill structure is different in each country, any organization or company that can provide significant information on the matter becomes of interest to the project, including enterprises (Business Incubator, Entrepreneurial Programs, Concessions, etc.) or universities (Faculty of Urbanism, Urban Technologies, Utilities, Transportation and others).

The ASCIMER team has visited three countries:

- **Jordan**, where the visit has taken place in Amman, the capital.
- **Morocco**, where five cities have been visited: Tangier, Tetouan, Chefchaouen, Asilah and Rabat.
- **Lebanon**, where the capital Beirut, has been visited, as well as a smaller city, Baakline, of which the Mayor is the President of Chouf Souayjani Federation of Municipalities.

Besides these differences among cities in the regions, some of the main common issues that Municipalities in the South & East-Mediterranean Regions have identified through the interviews and visits developed by the ASCIMER team. This is a summary of the general conclusions that have been extracted from them:

Regarding governance, management and financing, three main aspects must be highlighted:

- **Centralization:** the important role developed by the Central Government in these cities leads to some positive impacts, but also to financing and management difficulties for municipalities. Although some of the visited countries are under a process of decentralization at the moment, the Central Government is still taking charge of a wide range of tasks that will be relying on municipalities in later stages. Due to the different stages of this decentralization process, many municipalities are not being able to implement those tasks, and the Central Government is not being able to give them up. Besides, both municipalities and the Central Government agencies involved in municipal management suffer a lack of fiscal resources to launch pilot projects or develop plans. The fact that their competences are not formally separated nor defined will lead to difficulties in the financing process of future projects. Even municipalities (like Beirut, which have important incomes) will still have problems to launch these kinds of projects due to the complexity of their managerial issues. Access to funds for Smart City Projects is key to develop further projects and strategies.

- **Implementation problems:** capacity building in the Smart City field is a key issue to address. Providing guidelines and methodologies adapted to the skills and resources of the municipalities would be an important step in order to address planning and implementation problems at a local level. In-house monitoring of the solutions would be a key issue as well in order to ensure the success of the project. Besides, a need of advice regarding public tendering for digital/smart services must also be highlighted.

- Importance of the **bottom-up approaches and participation processes** in order to get the support of the community and to achieve the goals of the different projects: it is important to understand that the process of decentralization does not only need the support of governmental entities, but also the involvement of the whole community at the municipalities. In big cities, there is also a need for tools to assess which are the real citizens´ needs. An example could be the organization of neighbourhood committees, like in the case of Baakline, and their participation in governance, which is providing a strong basis to the local government, even if it cannot substitute the availability of resources nor the presence of municipal employees. Another interesting example is in the case of Chefchaouen which is developing a participatory budgeting system. These processes establish the basis for the development of Smart City projects with a strong social basis.

Regarding the opportunities for **multi-scale working and replicability of the Smart City projects in the region, the vision is two-folded.**

- On one hand, this can be a positive externality of centralization: the possibility of defining global strategies for the cities.

  Example: Morocco´s numeric program could be a starting point for Smart City Strategies. All the listed cities have a Strategic Development Plan for 2011-2016, with a midterm revision in 2014. All the Plans have been developed taking in account citizen participation; in fact, participation is a key pillar of these projects.

- On another hand, initiatives lead by municipalities are also able to reach a high level of cooperation and replicability. These initiatives could also be led by groups of municipalities as in the case of Lebanon, 660 municipalities (two thirds of the total number) are established in unions. These unions have pooled their resources in order to fund regional development projects. Also, like in the case of Baakline, some cities play a key role in the region and can be understood as drivers, having their projects as a great potential for replicability. Although they can also present managerial problems, it is important to take this figure into account in order to include the regional impact of Smart City Projects as an element of the assessment methodology.

One of the most important challenges identified during the visits is the fulfilment **of basic needs while facing new problems at the same time**. Municipalities must manage the fulfilment of basic needs that are already sorted out in municipalities in the North-Mediterranean regions. These problems can be solved with immediate solutions or by including a future vision that will be able to leapfrog the problems of North-Mediterranean regions. The development of a Smart City Model able to solve basic problems providing solutions for the future becomes crucial, and this must be taken into account when it comes to the evaluation of Smart City projects but also of basic projects that are suitable for including new technologies in their development. It is also important to highlight the common need of infrastructure renewal in the visited countries; this renewal can incorporate new technologies and new approaches that will allow facing these basic problems through innovative solutions. A good example could be the case of Baakline, where the presence of previous projects of Waste Management and Democratization have provided a more effective solution to the Solid Waste crisis Lebanon has been suffering within our visit, which shows that projects focused on basic needs must play a key role in the

evaluation. At the same time, municipalities must address new demands that are common for North and South Mediterranean regions, but with particularities, for example, the demand of digitalization of bureaucratic processes or the demand of public information. After the Arab Spring, the demand of a higher citizenship participation is especially important in the South and East-Mediterranean Region. In this regard, it is also very important to make sure that any developed strategy has a transversal character, or is capable of coping with the external (and very often unstable) political conditions in order to ensure the viability of any developed plan from theory to actual implementation.

## ANNEX 3: LIST OF PARTICIPANTS

**Municipalities of the Mediterranean Region:**
- **Fawzi Masad,** Chief Resilience Officer & Mayor's Assistant, Greater Amman Municipality.
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- **Mohamed Idaomar,** Mayor, Tetouan Urban Council.
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