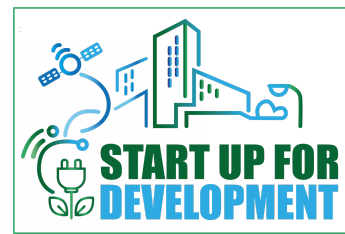


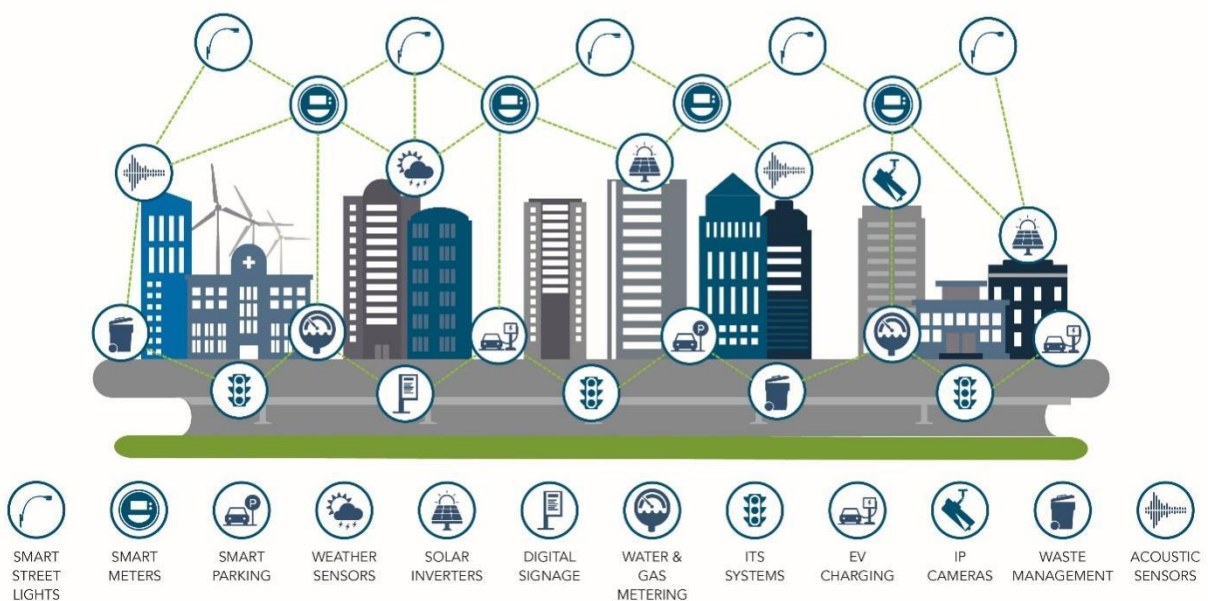


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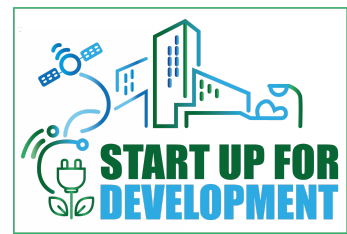
MODULE 6

SMART ECONOMY



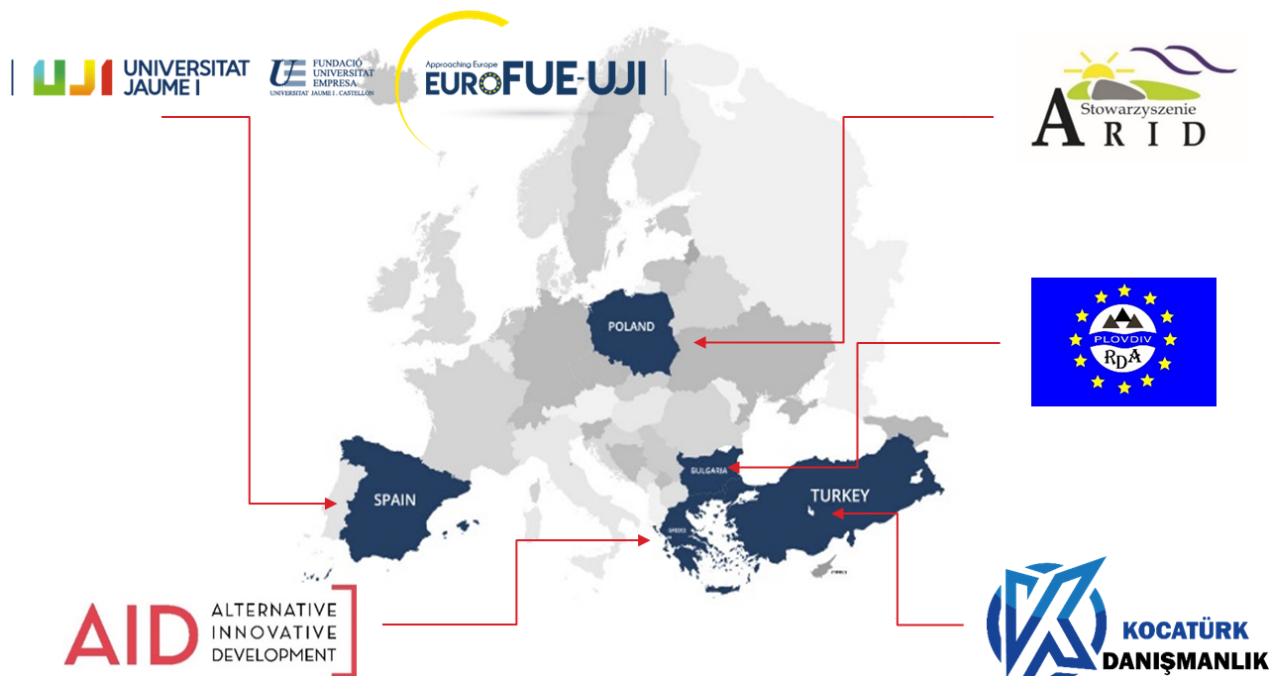


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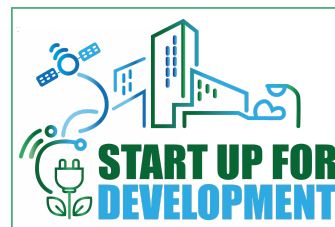
PROJECT PARTNERS:

Project Code: 2020-1-ES01-KA204-082611

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Kocatürk Danismanlik Özel Eğitim Hizmetleri Turizm ve Proje Hizmetleri Ticaret Sanayi Limited Sirketi (TR)

STOWARZYSZENIE ARID (PL)

Regional Development Agency with Business Support Centre for Small and Medium-sized Enterprises (BG)

ENALLAKTIKI KAINOTOMA ANAPTYXI ASTIKI MI KERDOSKOPIKI ETAIREIA (GR)

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ANNOTATION AND LEARNING GOALS

This module is focusing on introduction of the concept of Smart Economy.

Inclusive / sustainable economy is one that works for everyone, with no one being left behind.

It also protects the needs of future generations by ensuring that these can be met within the means of our planet. Entrepreneurship, Productivity, Competitiveness: Smart cities should be organized in a way that fosters new entrepreneurial initiatives, increased competitiveness, and high productivity in communities with the aim of improving the quality of life.

With a rapidly growing world population, urban populations are estimated to increase significantly over the next decades. This trend is reason for concern since the planet's resources are limited, and climate change is inherent. This focuses on the question about whether new technologies employed in smart cities can be the answer to current and future needs of a city population. Cutting-edge technological advances are reshaping our ecosystem; transforming society, living, and work environments; transport systems; energy grids; healthcare; communications; businesses; and education. How can cities respond to the multitude of challenges by employing technology and at the same time ensure the public well-being, improve the quality of life of city inhabitants, and make sure that the human is still at the centre of decisions?

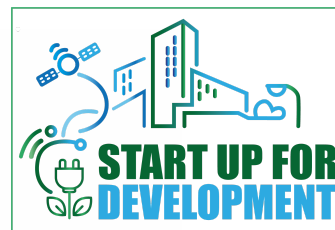
It is an adult education (online and offline) module focused on Smart Economy.

The main goal of the module is to sum up the knowledge of Smart Economy, skills and professional competencies in the field of Smart Governance, Smart Environment, Smart Transport, Smart life.

EXPECTED LEARNING OUTCOMES

By the end of this module, the learner should be able to argue and discuss several aspects of Smart Economy Concept such as Smart Government, Smart Economy, Smart Environment, Smart Living, Smart Mobility, and Smart People.

This module will help learners to understand the dimensions of smart economy, and the elements that compose it in today's modern life. This module requires self-learning with the materials, the assessments, as well as the training activities. The main purpose for the trainees is to learn by reading, exercising, applying, and evaluating their knowledge. Moreover, the module uses theory, case studies and examples, and presents several smart and innovative technologies. Finally, by the end of the module, there is a list with several additional resources to facilitate the learners during the reading process.



At the end of the study of the module and after having carried out the activities included in it, the student will be able to acquire the following knowledge, skills and competences:

Knowledge:

- of the concept of smart economy
- Identify the core dimensions of smart economy
- sums up the knowledge, definitions related to for Smart Economy
- Know smart life things and learn how to make use of them.
- Gain a deep understanding of the nature of smart economy
- Understand potential applications of the materials relevant to smart economy learned in this module.

Skills:

- Recognize and interpret the concept of smart economy.
- Assess the significance of smart economy in their daily lives.
- Discuss and Share Smart Economy Aspects and Terms

Competences:

- Ability to share the obtained knowledge to peers and interested individuals with the topic of smart economy
- Raise awareness relevant to smart economy and its proper management and use
- Professional competences to use the acquired knowledge in their own daily life

FORMS AND METHODS OF WORK

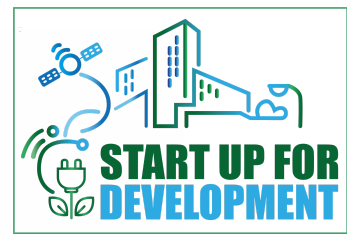
The methods used in this module are those recommended by the project coordinating group.

The working methods are:

- Lecture with discussion (online/offline)
- Training seminars (online/offline)
- Self-study (online/offline)
- Interactive activities
- Case study



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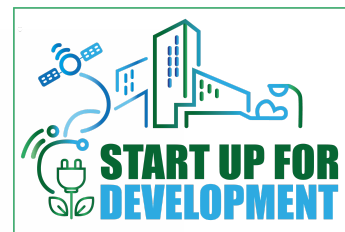
The methods used in the work are appropriately selected to address all levels of the taxonomy of learning, namely – perception, understanding, application, analysis, synthesis, and evaluation.

Mode of study: online, physical, blended

The main forms and methods of work are:

- lecture with discussion (online/offline)
- training seminars (online/offline)
- self-study (online/offline)

Study materials: books, readers, online and offline training materials, PPP



GENERAL MODULE OVERVIEW

The module is focusing on relationship between the mobility function of the city ecosystem and sustainability in its triple environmental, social, and economic dimension. It includes conceptual background of smart economy and cases studies.

UNIT 1. CONCEPTUAL BACKGROUND OF SMART ECONOMY

1. 1. Introduction

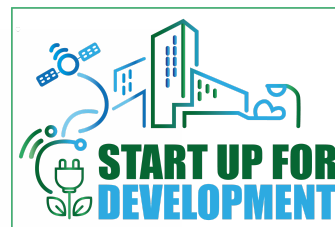
1.1.1. The analysis of smart economy concept

Economic growth can only be qualitative or focused on issues of income, health and education (basic needs), in situations that relate to wellbeing or environmental compatibility. In these conditions, the development of the concept of eco-sustainable efficient distribution becomes crucial because the accomplishment of needs involves the production of goods; production interferes, inevitably with the marginal allocation and distribution generated by the market and / or the price dynamics, covered by the concept of "smart economy". The concept of "smart economy" brings together several features of the new economy in an innovative sustainable and eco-economic approach: high- productivity economy, global economy growth, competition, economic progress, economic prosperity, innovation, sustainable jobs, and digital economy.

The concept of "smart economy" is the process by which the individual aims at achieving freedoms caused by the accidental or voluntary choice of a way of life, conditioned by the economic dimension in which the individual exists.

The defining characteristics of the concept of "smart economy" are:

- it is an evolutionary process: the concept of "smart economy" requires new qualitative approaches of the concept of economic growth, focused on the quality of life and on the standard of living, incorporating new variables of the development model;
- it is a dynamic process, adaptable to contextual situations in which the individual and the community act in time and space
- it is a multidimensional concept, characterized by three interrelated dimensions: **economic** (endowment with economic resources that allows one obtain a certain income necessary to achieve a certain standard of living



considered optimal), **social** (achievement of optimal health and education parameters that allow one assign the qualitative character of development

and achieve a state of security, physical and material) and psycho-motivational (establishing subjective arguments, corresponding to the inner structure of the individual regarding personal development in the context of the evolution of knowledge, society and the economy);

- aims at the individual: "causa finalis" of the concept of "smart economy" is the constant improvement of the quality of people's life, of the living conditions, of the creative side of the individual and the community by continuously adapting and correcting social and economic and environment policies, both at community level and at national, regional and global levels;
- it is a process of effective allocation of economic resources: monitors the process by which wealth is created in the economy, as well as the way in which it is distributed in terms of the individual and the community, in order to reduce social phenomena such as: poverty, hunger, discrimination, inequality of opportunity, gender inequality, infant mortality, illiteracy, or violence – or economic: unemployment, ensuring decent working conditions, access to health insurance schemes, education, labour and social protection;
- it is a process of choice / decision of the individual on the way in which to use the income to ensure the well-being, on the one hand, and on the way of establishing a hierarchy of the qualitative variables (freedoms, rights) in a system of preferences based on utilities (capabilities and functioning's).

By developing the concept of "smart economy" we intend to identify measures to stimulate entrepreneurship for a smart, sustainable and inclusive growth of economy by harnessing the creative, innovative potential, of ICT skills specific to human capital.

1.1.2. What is Smart Economy?

Smart Economy is **an economy based on technological innovation, resource efficiency, sustainability, and high social welfare**. Smart Economy adopts innovations, new entrepreneurial initiatives, increases productivity and competitiveness, with the overall goal of improving the quality of life of all citizens

This is technology based, closely connected and using ICT applications for economic advancement, urban planning, and public health improvement. It brings together higher productivity, efficiency, and competitiveness through increased innovation. It is characterized by many new flexible forms of working and start-ups. Smart economy is expected to generate more products and services with less energy and pollution, and create social benefits.



The main goal of a smart city is **to optimize city functions and promote economic growth while also improving the quality of life for citizens by using smart technologies and data analysis**. The value lies in how this technology is used rather than simply how much technology is available.

With digitization and disruptive technologies changing the requirements of many jobs today, smart cities will have to develop strategies to address jobs of the future that will power Industry 4.0 and the smart economy. Advances in technologies will also help streamline government procedures, providing a seamless experience to businesses.

Digital services and applications of informatics have become a new way of life and interaction between individuals, society, and government. The blending of technology with human resources has led to the emergence of a smart life moving, at an accelerated pace and easily in the style and form, characterized by the ease, speed, and accuracy in the delivery of public services and business.

The concept of smart economy is becoming more popular in the scientific and various strategic documents. This concept is used in a wide range of contexts: the smart urban design and development, economic development, strategic planning, advertisement of the cities and branding. The research has shown that up to now there is no single, generally accepted definition of the smart economy. The absence of a clear smart economy concept among scientists, politicians and businessmen does not allow to sufficiently precisely understanding the specificity of a smart economy and direct strategically targeted actions for strengthening and promotion the emergence and development of the smart economy in the city.

The process of creation the economic value in the city is used as the tool to reveal the definition and key features of the smart economy.

1.1.3. Smart city indicators

Following a holistic strategy along six key strategic action fields is the pathway to becoming a truly smart city.

<https://www.beesmart.city/en/smart-city-indicators>

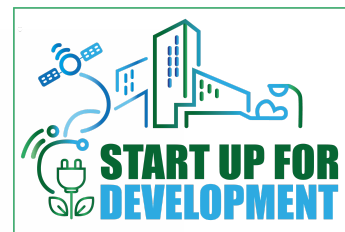
BUILDING THE SMART CITY: ADVANCING IN SIX FIELDS OF ACTION

We are certain that to become a truly smart city or community, municipalities need to advance in six key strategic action fields: **Smart Government, Smart Economy, Smart Environment, Smart Living, Smart Mobility, and Smart People**

Within all six beforementioned smart city indicators, subcategories can be formed to tackle specific city challenges or to seize development opportunities. For advancing in each subcategory, a set of solutions needs to be created, adapted, or replicated.



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For all six strategic action fields, subcategories are laid out in more detail in the following paragraphs:

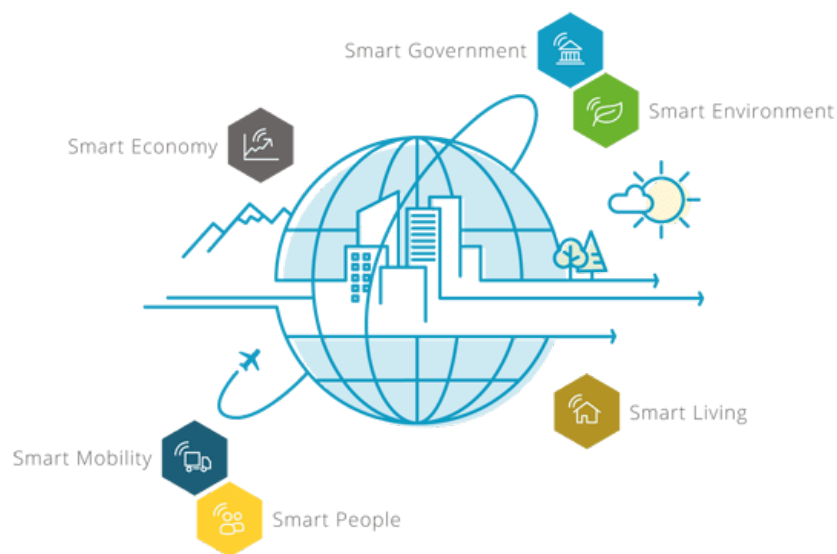


Figure 1. Smart City Indicators (Source: <https://www.beesmart.city/en/smart-city-indicators>)

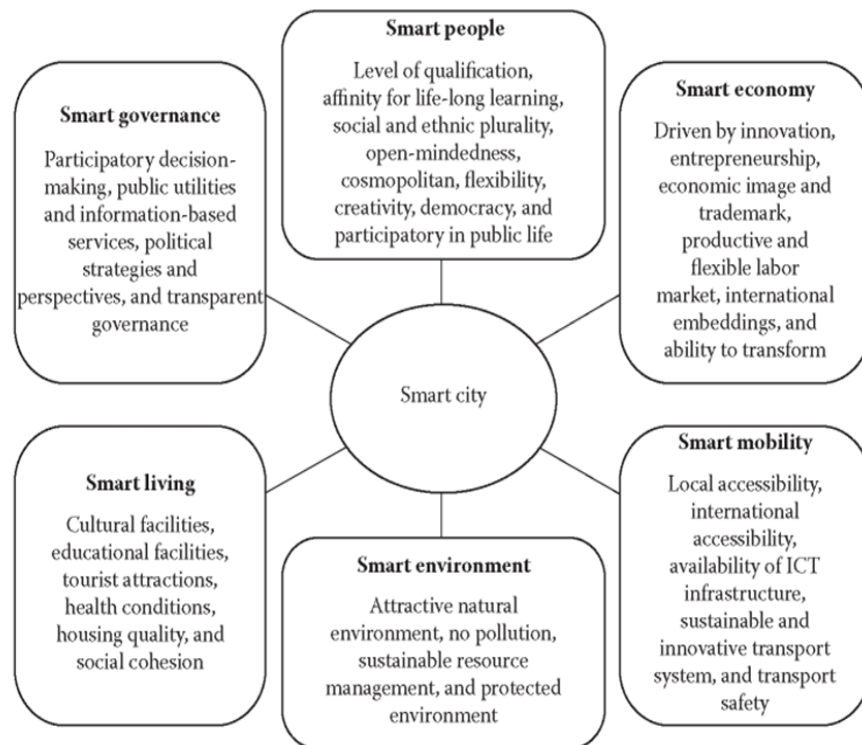


Figure 2. Smart City Indicators

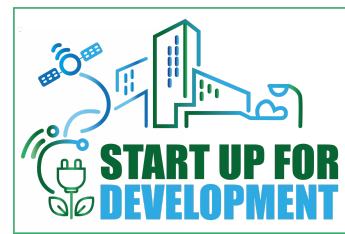
1.1.3.1. Smart government

"Smart Government" is about strengthening the connections and interactions between the government and all stakeholders - citizens, businesses and other organizations of the civil society - within a municipality.

A municipal government following a smart city strategy is uniquely positioned to reconsider the quality, scale, and scope of services for citizens and businesses that it offers.

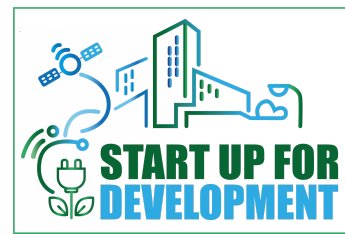
By utilizing new methodologies, such as co-creation or crowd-sourcing, or by implementing new technology and innovation (e.g. for digital citizen or business services or the management of public infrastructure) a "smart government" can be developed.

The World Bank's identification of four aspects to good governance: Public-sector management, accountability, legal framework for development, and transparency and information. To these, we can add deregulation, diffusion of knowledge and the importance of civil society, to extend the definition



The main components of smart governance that are governmental organization, citizen participation (and, consequently, government-citizen collaboration), and the use of technology.

- **Governmental Organization:** The *first* organizational characteristic, commitment, refers to the extent to which local government is motivated to engage in sustainable development through ICT-supported urban collaboration. The *second* organizational characteristic regards the responsiveness of government. A longstanding relationship between government and citizens requires governments to become a receptive partner towards inhabitants. The *third* organizational characteristic is operational management
- **Citizen Participation:** The second building block of smart governance is citizen participation. Citizens can offer useful and helpful suggestions for government agencies to arrive at better informed policy decisions.
- **Use of Technology:** The final building block of smart governance is the use of technology, in particular ICTs. Smart governance can leverage modern technologies such as Internet of Things (IoT), Artificial Intelligence (AI), and Blockchain for numerous applications



The main characteristics of smart governance are transparency, negotiability, and participation. There are also some requirements of smart governance:

- **Simple:** User-friendly governance through simplification of rules and regulations of the government with the application of ICT.
- **Moral:** Designing a government system based on moral values to uphold the spirit of good and efficient governance.
- **Accountable:** Development of effective information management systems to ensure the accountability of public service functionaries.
- **Responsive:** Making the system more responsive by the streamlining them efficiently for more convenience.
- **Transparent:** Clear and transparent government processes through the use of public domain websites and portals



1.1.3.2. Smart economy

This is technology based, closely connected and using ICT applications for economic advancement, urban planning, and public health improvement. It brings together higher productivity, efficiency, and competitiveness through increased innovation. It is characterized by many new flexible forms of working and start-ups. Smart economy is expected to generate more products and services with less energy and pollution, and create social benefits.

“Smart Economy” describes all actions aimed at transforming and strengthening a municipality’s economy.

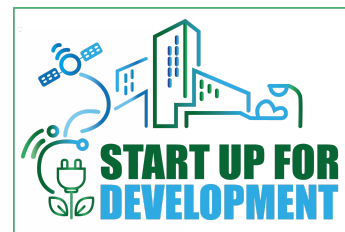
Improving the overall business climate, a city’s attractiveness for start-ups, investors, businesses, and new (highly qualified) talent as well as growing the economy in an innovative and sustainable way to increase competitiveness are the most important goals.

Utilizing (digital) technology and intelligent approaches lead to economic prosperity that, in turn, generates stable and favourable conditions for all stakeholders.

From a government perspective, "smart economic development" is an important tool to actively seize opportunities and provide conditions that support the creation and growth of businesses as well as new jobs.



Figure 3. The main characteristics of smart economy



Characteristics of Smart Economy:

- driven by innovation,
- entrepreneurship,
- economic image and trademark,
- flexible labour market,
- international embedding,
- ability to transform

A smart city uses information and communication technology (ICT) to improve operational efficiency, share information with the public and provide a better quality of government service and citizen welfare.

The main goal of a smart city is to optimise city functions and promote economic growth while also improving the quality of life for citizens by using smart technologies and data analysis. The value lies in how this technology is used rather than simply how much technology is available.

A city's smartness is determined using a set of characteristics, including:

- An infrastructure based around technology
- Environmental initiatives
- Effective and highly functional public transportation
- Confident and progressive city plans
- People able to live and work within the city, using its resources

The success of a smart city relies on the relationship between the public and private sectors as much of the work to create and maintain a data-driven environment falls outside the local government remit. For example, smart surveillance cameras may need input and technology from several companies.

Aside from the technology used by a smart city, there is also the need for data analysts to assess the information provided by the smart city systems so that any problems can be addressed and improvements found



1.1.3.3. Smart environment

“Smart Environment” describes how a municipal government manages the built and natural environment to improve liability for citizens and visitors.

Utilizing new technology and innovative methodology support the implementation of regulatory and cultural changes that facilitate sustainable standards and practices.

The reduction of waste production, monitoring and managing pollution, emission reduction, water management, achieving energy efficiency, and accelerating the local energy transition are some important goals of "smart environment" initiatives.

New urban planning standards to improve efficiency and to minimize the environmental impact, as well as the creation of a resilient community are further goals.

The idea to build an environment with embedded sensors, displays, and computing devices so that users can better understand and control the environment.

Smart Environment is about a different technology which is aiming to implement innovative solutions in cities and villages.

Characteristics of Smart Environment:

- attractive natural environment,
- no pollution,
- sustainable resource management,
- protected environment

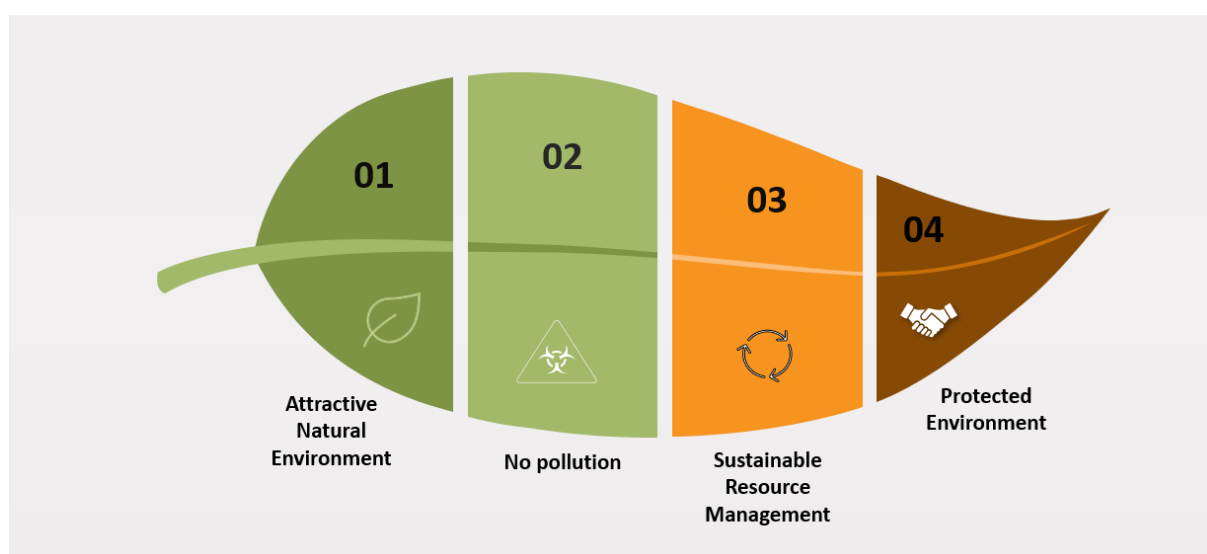


Figure 4. The main characteristics of smart environment



1.1.3.4. Smart living

“Smart Living” aims at increasing quality of life for residents and visitors by following an inclusive strategic approach – across all age groups and demographics. Facilitating liability and optimizing the management of the living environment are two aspects that need to be jointly addressed to maximize benefits for the municipal government and its stakeholders.

Smart Living focuses on improving social and digital inclusion (e.g. the use of electronic services, connectivity, and social platforms), on improving healthcare and care for the elderly (e.g. eHealth, Ambient Assisted Living), safety, housing conditions, and smart buildings.

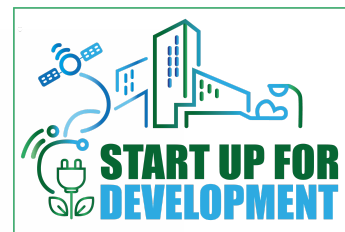
New methodologies for civic and social engagement as well as new technologies (e.g. IoT based on WiFi or LPWA network technology) are leveraged to improve accessibility and citizen experience across all focus areas.

Characteristics of Smart Living:

- cultural facilities,
- educational facilities,
- tourist attractions,
- health condition,
- housing quality,
- social cohesion



Figure 5. The main characteristics of smart living



A smart life definition must include information technology and computer systems that positively impact individuals' way of living. Smart life comes from placing people in the foreground and the quality of their lives. The city can provide and offer various parameters that, related to natural resources and infrastructure, are to offer better options of occupation and, consequently, better quality of life. Many scholars, researchers and practitioners have also referred to smart living. Smart Living, as a trend, involves improved standards in several aspects of day-to-day life, ranging from homes and residencies to workplaces, even the way people are transported within cities. Smart life uses software and the Internet of Things (IoT) to simplify and improve many daily activities and life planning. Interchangeably "smart life" term is used also as smart living

All smart living activities also have these six components integrated with the smart city system. Cities have their own characteristics based on the size whether it is a metropolis, megacity, meta city or small or very big continental settlement. It is easily understood that smart living as a trend, involves improved standards in several aspects of day-to-day life, ranging from domiciles, workplaces and the way people are transported within cities. Within the context of construction of buildings, the trend can be identified through the growing existence of innovative, quicker, cheaper, and more efficient construction technologies, materials, processes, and concepts.

Elements of Smart Life:

- smart buildings,
- smart home,
- smart vacuum robot case,
- smart governance,
- smart things,
- smart medicine (health),
- smart life for smarter regions.



1.1.3.5. Smart mobility

“Smart Mobility” focuses on increasing the efficiency and service quality of urban transportation to enhance the use and adoption of new mobility solutions as well as to increase people mobility through efficient mobility management and targeted infrastructure investments. Achieving cheaper, faster, and environmentally friendly mobility as well as integrated multi-modal transportation is an important challenge for cities and communities.

Supporting the combination of multiple modes of public and private transport, and adopting new forms of transportation (e.g. electric vehicles, hydrogen-powered vehicles, autonomous vehicles, bike sharing, carpooling/car-sharing) is an important aspect for a future-oriented strategic approach to foster “Smart Mobility”.

A customer-centric and inclusive approach for all citizens, businesses, and visitors is needed to achieve a high-quality mobility service and to ultimately improve the flow of people and goods within a city or community, while at the same time reducing the environmental impact

Characteristics of Smart Mobility:

- local accessibility,
- international accessibility,
- availability of ICT infrastructure,
- sustainable and innovative transport systems,
- transport safety

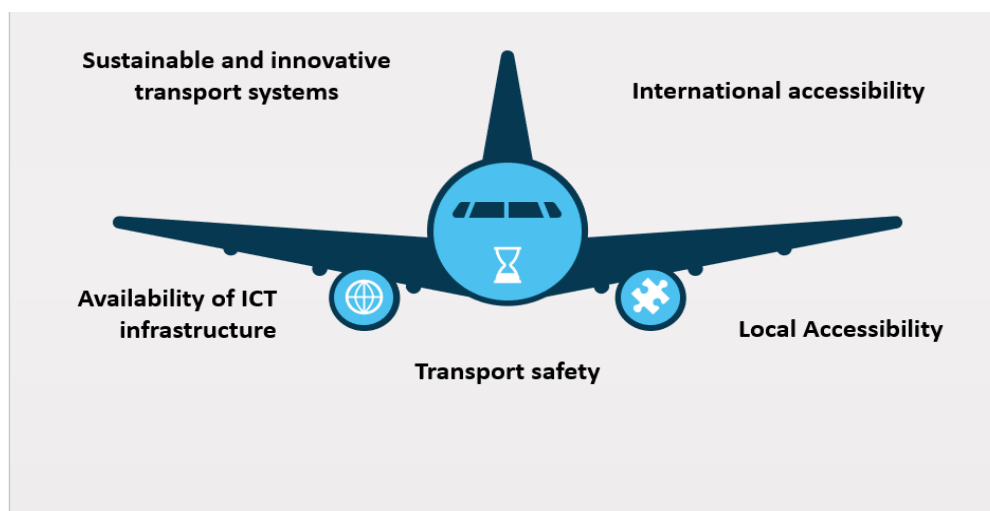


Figure 6. The main characteristics of smart mobility



1.1.3.6. Smart people

First, “Smart People” aims at transforming the way citizens interact – via information or the provision of services – with the public and private sector as individuals or businesses. Creating social and digital inclusion/digital equality through educational offers is an important prerequisite for a more efficient provision of information and services based on new technologies.

Second, “Smart People” is about smart forms of education to facilitate career choices, labour market opportunities, vocational training as well as lifelong learning for all age groups and demographics. Talent development is also an important aspect from an economic development perspective as an increasingly important location factor.

“Smart People” solutions support the creation of an accessible and inclusive environment to increase prosperity and innovation within a city or community. Participation, open-mindedness, and creativity are some aspects that are enabled or nurtured by implementing intelligent solutions.

Characteristics of Smart people:

- level of qualification,
- affinity of life-long learning,
- social and ethnic plurality,
- open-mindedness,
- cosmopolitan,
- flexibility,
- creativity,
- democracy and participatory in public life

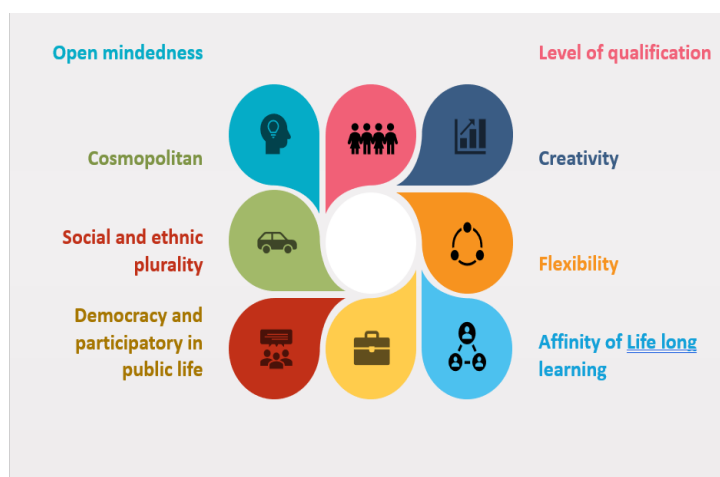


Figure 6. The main characteristics of smart people



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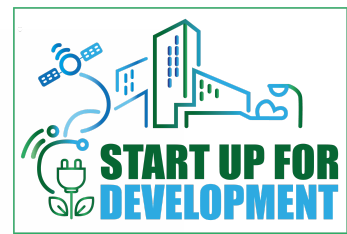
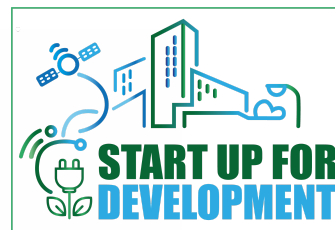


Figure 7. Smart cities mandala (source: European Union and Giffinger et al.)



UNIT 2. CASE STUDIES

2.1. Smart Economy, Circular City, City of Valladolid

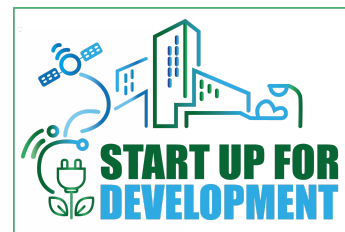
The Spanish city Valladolid signed the Declaration of Seville in 2017, where it stated its commitment to introduce circular models within its infrastructure, economy, and social frame. In this case, the Agency for Innovation and Economic Development oversees developing the roadmap, as one is more tangible than a strategy for its city, as it's necessary to consider the economic angle for its citizens.

The main social issue that the city has encountered is the high unemployment rate. The introduction of circular models and redesign of current linear models will lead to the creation of several jobs. This can be applied to qualifications of the workforce. The roadmap has been designed to cover five essential topics: define the approach, make the diagnosis, raise awareness, and encourage participation, promote CE among companies, businesses, and the entrepreneurial ecosystem and lastly, position Valladolid as a circular city. Simultaneously, the city subsidises programmes for local circular endeavours. The year 2019 was mainly focused on textiles, plastics, and food. And although grants support specific projects, it is essential for the city to create a community that supports circular projects and where new ideas can be presented as well as developed. There have been weekly meetings since 2017, and the number has been increasing ever since, which is a positive result regarding awareness and that the circular movement is growing.

The city also participates with other European experts on different projects, such as Interreg Circular Lab, Circular Economy in Cities and Regions Programme.

In 2020 the Innolid project was launched, which is dedicated to economic, climatic, demographic, environmental and social challenges through operational, practical, and intelligent urban planning but also addresses opening spaces and improving communications and interrelationships. Valladolid has focused on promoting electric mobility by promoting appropriate measures, tax incentives, and planning of charging points and professional fleets. The city and stakeholders are advancing on improving the quality of citizens by offering more efficient, intelligent public services. Simultaneously they try to improve and innovate the cooperation between agencies on a horizontal and vertical level while using collective intelligence to increase prosperity and local competitiveness. Another initiative, called Smart City VyP targets technological development projects in order to improve sustainable mobility, greater energy efficiency, and a more transparent government with the use of electronic administration.

Valladolid City has put forward over 20 European-funded projects so far. The spectrum is broad, as they cover many different areas of a city's dynamic.



The project URBAN GreenUP focuses on using nature-based solutions in transforming spaces by changing facades, applying green roofs, and building mobile gardens, which not only improve the urban landscape of the city but also benefit the community. Tourism has always been a big part of the economy, hence why the S2CITY (Intelligent System of Citizen and Tourist Services) project has been implemented. Its main objective is to facilitate municipal services for locals and tourists through ICT and Big Data. Another project that is vital for the sustainable development of the city is CENCYL VERDE which focuses on creating guidelines for green infrastructure that has spill-over into education, health, urban planning, mobility, etc.

INLIFE is one of the projects that promote sustainable education. This works through a gamification platform with two games, one of which is dedicated to children with autism and mitigating social inclusion

The city has ongoing projects and will continue its trajectory according to the roadmap. So far, the projects have covered many areas of a city's anatomy, which improve the quality of life for different groups while also taking into consideration making a positive impact on the environment.

Source:

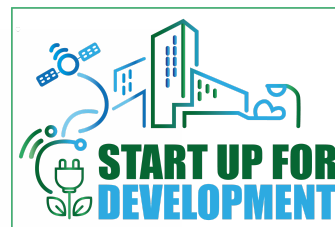
<https://www.circularcityfundingguide.eu/case-studies/city-of-valladolid-economic-prosperity-through-circularity/>

2.2. Case study on smart city

International Research Journal of Engineering and Technology (IRJET) (2019)

The topic of smart city is increasingly discussed in the public debate but there is no sharp definition from a scientific point of view. A smart city (Also smarter city) uses digital technologies or information and communication technologies (ICT) to the enhance quality and performance of urban services, to reduce cost and resources and consumption and engage more effectively and actively with its citizens. Major technological, economic and environmental changes have been generated interest in smart cities including climate change, economic restricting, and the move to online retail and entertainment, ageing the population and pressure on public finances. Besides the proclaimed potential making a city more efficient, there will a critical consideration of the problem of having a city, where all urban data is connected. The art of science of ordering the use of land and sitting of building and communication routes so as to secure the maximum practicable degree of economy, convenience, beauty is known as town planning.

The first question is what is meant by a 'smart city'. The answer is, there is no universally accepted definition of a Smart City. It means different things to different people. The conceptualization of Smart City, therefore, varies from city to city and



country to country, depending on the level of development, willingness to change and reform, resources and aspirations of the city residents. A Smart City would have a different connotation in India than Europe. Even in India, there is no one way of defining a Smart City. On 10 July 2012, the European Commission launched the Smart Cities and Communities European Innovation Partnership. The partnership proposes to pool resources to support the demonstration of energy, transport and information and communication technologies (ICT) in urban areas. The energy, transport and ICT industries are invited to work together with cities to combine their technologies to address cities' needs. This will enable innovative, integrated, and efficient technologies to roll out and enter the market more easily, while placing cities at the centre of innovation.

Five steps to smart:

- Set the vision: an efficient + liveable + sustainable city.
- Bring in integration to improve overall city efficiency (operation & information).
- Combine hardware + software solutions to improve the efficiency of urban operating systems
- Add innovation to make a holistic sustainable future a reality.
- Drive collaboration between best-in-class global and local players

<https://www.irjet.net/archives/V6/i5/IRJET-V6I51130.pdf>

2.3. Smart Cities: Case Studies – Amsterdam

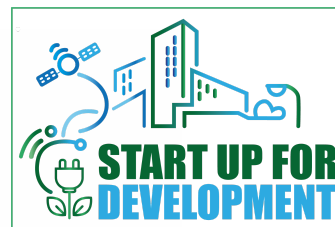
Smart Cities: Case Studies by Eleonora Riva Sanseverino, Raffaella Riva Sanseverino, Valentina Vaccaro, Ina Macaione and Enrico Anello

The northern European cities have been for long engaged in the field of sustainability, economy with low environmental impact, high quality of life and liveability of urban spaces. Among these, in the most recent European rankings of smart cities, cities like Amsterdam are in evidence as the forerunners of smart cities, as they entered in the forefront positions in the first rankings done by international research centres.

Amsterdam Smart City

The Amsterdam Smart City program, launched in 2009, is a good example of an initiative organized and financed by a mix of public and private funds. In the organizational structure of the program, the Public Administration is a partner in governance and operation. Along with private groups (Alliander, KPN, etc.).

The city of Amsterdam has been at the forefront to support the Amsterdam Smart City program, ASC, not only in economic terms, but also encouraging collaborations and results orientation.



The starting point of collaboration of the Amsterdam Smart City program is the fact that the funding partners are engaged in long-term objectives, related to the problems the metropolitan area of Amsterdam is currently facing and the opportunities that are and will be made available.

A deployment of new infrastructures was started, enabling all kinds of new products and services: intelligent energy networks, fibre to the home and open data.

In other words: power, connectivity, and data. These basic infrastructures, have allowed other companies to develop and implement innovation, bringing energy savings, more efficient health care, less traffic, and greater availability of services.

ASC is developing the program on behalf of all founding partners, with two main objectives which are: to facilitate the bottom-up innovation, and bring together the investments that will be incurred in the coming years. These objectives have produced more than 20 pilot projects in the first 3 years and a collaboration with 72 partners.

The ASC model is very simple: in the centre there are three founding partners, all of which have long-term economic interests concerning infrastructures to be given in use, and joint ambition to solve societal problems. Through ASC Program they shall cooperate with other subjects: strategic partners in certain thematic domains (companies like Philips, Cisco, IBM, Accenture) and small and medium enterprises at the individual project level. In this way, there is a differentiation between the partners with long-term goals (partners in the field of infrastructure), with medium-term goals (strategic partners), and short-term goals. The involvement of public administration is essential; in fact, it creates confidence in the achievement of objectives, ensuring open data, long-term commitment, targeted policies, and leadership.

Even today Amsterdam Smart City is a collaborative plan that continues to bring collaboration between residents, government, and local production bodies, in order to implement a high level of energy savings [19]. Energy end-use efficiency, use of renewable energy, smart grids and recharging facilities for electric vehicles are some of the elements that have been composed to achieve a single final goal that, according to the administration, will quantify in a reduction of 40 % of CO₂ emissions by 2025, compared to 1990 levels and of 75 % by 2040 The plan continues to develop through various projects covering the following areas: mobility, quality of life (health, safety and tourist attraction), care of the social and human capital, resource efficient, intelligent infrastructures and open data.



The project provided for the following interventions:

- bus stops created with recycled material;
- led based public lighting powered by solar panels on the roof of the stops;
- compactor bins for separate collection of waste powered by solar generators (these devices press the waste and allow a reduction in weekly cycles of waste collection as well as the volume needed for their storage in special centres).

The continued success of the Amsterdam Smart City project is the definition of a strategic plan, marked by progressive stages which is fundamental for the implementation of the objectives and individual measures

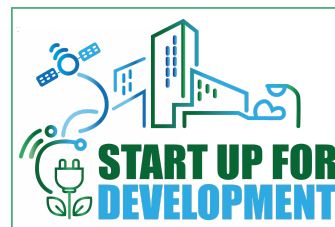
Smart Energy

The project actions in the context of energy are central in the city strategy. In fact, Amsterdam in this area, is a benchmark for all other European cities since 2009, placing itself as an urban laboratory for energy.

Smart Mobility

The transport system is one of the main responsible of air pollution in large cities. In Amsterdam, one third of all CO₂ emissions come from the maritime transport system. The port of Amsterdam, for cruise ships and cargo ships, is located near the city centre. The energy supply system of the moored boats, as for most of the touristic European ports until a few years ago, relied on self-production of energy through diesel generators on board.

The project “Ship to Grid” includes the installation of 73 electricity distribution units from renewable sources on the banks of the river IJ with a total of 300 connections. The moored boats can switch off their generators allowing the reducing of CO₂ emissions of the city. Etc.



BIBLIOGRAPHY

- Jurgita Bruneckienė (2014). The Concept of Smart Economy under the Context of Creation the Economic Value in the City
- Giffinger, R., & Pichler-Milanović Nataša. (2007). Smart cities: Ranking of European medium-sized cities. Centre of Regional Science, Vienna University of Technology.
- Giffinger, R.; Fertner, C.; Kramar, H.; Kalasek, R.; Pichler-Milanovic, N.; Meijers, E. Smart cities Final Report ranking of European Medium-sized Cities Final Report 2007, Edited by the Centre of Regional Science, Vienna UT. Available online: <http://www.smart-cities.eu>;
http://www.smartcities.eu/download/smart_cities_final_report.pdf.
- Diana Apostol 1, Cristina Bălăceanu 2, Eleonora Mihaela Constantinescu. SMART-ECONOMY CONCEPT - FACTS AND PERSPECTIVES
- Smart Economy and Startup Enterprises in the Visegrád Countries - A Comparative Analysis Based on the Crunch base Database settings
- Petra Kinga Kézai, Szabolcs Fischer, Mihály Lados. (2020) Smart Economy and Startup Enterprises in the Visegrád Countries - A Comparative Analysis Based on the Crunchbase Database
- Elizabeth Frank (Universidad CEU San Pablo, Spain) and Gloria Aznar Fernández-Montesinos (Universidad CEU San Pablo, Spain). (2020) Smart City = Smart Citizen = Smart Economy?: An Economic Perspective of Smart Cities, <https://www.igi-global.com/chapter/smart-city-smart-citizen-smart-economy/256262>
- Anttiroiko, A. V., Valkama, P., & Bailey, S. J. (2014). Smart cities in the new service economy: building platforms for smart services. *AI & society*, 29(3), 323-334.
- Aguayo, M. O., & Coady, N. F. (2001). The Experience of Deafened Adults: Implications for Rehabilitative Services. *Health & Social Work*, 26(4), 269-276. doi:10.1093/hsw/26.4.269
- Smart Living for Smart Hong Kong Sujata S. Govada, Widemar Spruijt, Timothy Rodgers, Leon Cheng, Hillary Chung, and Queenie Huang
- Govada, S. S., Spruijt, W., Rodgers, T., Cheng, L., Chung, H., & Huang, Q. (2020). Smart living for smart hongkong. *Smart Living for Smart Cities*, 75-135. https://doi.org/10.1007/978-981-15-4615-0_2
- Fred, H., & Luximon T., (2016). Examining the Usability of Message Reading Features on Smartwatches. *International Journal of Humanities and Social Science Invention* 5 (4): 68-76
- Su, K., Jie, L., & Hongbo, F. (2011). Smart city and the applications. 2011 International Conference on Electronics, Communications and Control (ICECC), Ningbo, China, IEEE
- Püschel, L., Röglinger, M., & Schlott, H. (2016). What's in a smart thing? Development of a multi-layer taxonomy. In 37th International Conference on Information Systems (ICIS), 1-19.