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Introduction

The EU budget has contributed to deploy solutions on the things that matter for Europeans: urban areas have been a key issue in EC funding programs. In fact, the EC promoted RD&I on urban areas providing support through a wide range of funding programs covering funding opportunities (H2020 pillar of “societal challenges”, European Fund on Strategic Investments, European Structural and Investment Funds, Urban Innovation Actions, Urbact, Life, ...). According to this approach, many Member States pooled resources at European level, achieving more than by acting alone. Therefore, together with national budgets and a wide array of legislative and regulatory instruments, the EU budget has allowed to support shared objectives and tackle common challenges including CO₂ reduction in urban areas and a carbon-neutral economy through initiatives aimed at implementing the so-called “Smart Cities”.

It is thanks to the coordinated EU/Member State approach that RD&I pushed smart cities and smart specialisation strategies as two novelties that have been quickly adopted by policymakers and translated into specific policies and initiatives that were mainstreamed into regional policies.

Success stories and best practice challenges¹ lay on a technological focus in the fields of energy, mobility, transport, ICT, and on successful replication, which means meeting the challenges of finding suitable financing and coming up with innovative business models to create a project with strong impact and meaningful results. Testing and developing a smart specialization strategy to transform the energy and urban landscape of cities is undoubtedly a complex task, even if encouraged by the challenging experiences of the numerous projects funded by EC. Once the tricky path of finding a successful and innovative solution is completed, the road is far from over. Overall, innovations are facing a day of reckoning; it is a time when the costs of entering the market and up scaling simply cannot be overcome. Indeed, the lack of venture capital, market failures and other barriers can bring the process to a sudden stop. This is a reality for smart city solutions, where the number of barriers are often far higher than in many other areas of innovation.

We can say that a European vision of coming Smart Cities lies on the understanding of how to move from high objectives to specific innovative solutions and how replicate successful innovations in a local context - being aware that each solution applied to a city involves a combination of technologies which are adjusted to the needs of a specific city and that can be affected by many factors (technological, financial, economic, regulatory and administrative, social and stakeholder uptake, etc.).

Therefore, this is the added value that the coordinated EU/

Member State approaches in funding RD&I programmes on Smart Cities have produced within the framework of the H2020 programme.

The smart city concept

Cities and urban areas have been a key issue in EU/Member State policies and programmes, in the light of the fact that over two thirds of the European population live in urban areas and that cities were and will be places where both problems emerge and solutions are found, places which are fertile ground for science and technology growth, for boosting culture and innovation, for supporting individual and collective creativity and where, more than anywhere else, climate change mitigation can be more easily perceived. Cities play a crucial role as engines of the economy, as places of connectivity, creativity and innovation, and as centers of services for their surrounding areas. Therefore, cities are essential for a successful implementation of Europe.

Even if European cities play a key role in the lives of Europeans, it seems almost paradoxical that there is no common definition for “urban” or even for “city”, and that the European Union has no explicit competence in urban development, as urban planning per se is not a European policy competence even if economic, social and territorial cohesion all have a strong urban dimension. Therefore, even if the “European model of the city” is a fascinating issue, it is clear that there is no way to adopt a single definition; however, it is still possible to move towards a shared European vision of urban development, as noted by the paper “Cities of Tomorrow” (DG Regional Policy, 2011) which consider that «there is not a single vision of the European city model but there might be as many visions as there are Europeans. These visions are diverse as they build on different realities, different strengths, weaknesses, opportunities and threats as well as different values».

This means that Europe can play a role in setting the framework and providing guiding principles which help the growth of a shared vision of European cities, where the dimension of a sustainable urban development is taken into account in an integrated way. In general terms, this is what occurred with European funding in RD&I: even though the EC has no explicit competence in urban development, policies and programmes on RD&I have undoubtedly contributed to promote and support a shared European vision for Smart Cities.

Many of these programmes have become EU trademarks, making the EU visible and recognizable in the daily lives of its citizens.

The basic idea behind this shared vision is that European cities want to be places of advanced social progress, platforms for democracy, cultural dialogue and diversity, places of green, ecological and environmental regeneration.

Since 2007, many discussions, workshops, white papers, documents of work have been developed about the future of cities, both at national and European level, while glossaries have been prepared according to the idea that in the transition from industrial to knowledge-based societies, the cities of the world are changing their shapes. As a result, several definitions were created: shrinking cities², second cities³, slow cities⁴, slum cities⁵, historical cities⁶, and then green cities⁷, healthy cities⁸, community cities⁹, and - last but not least - quality-of-life cities¹⁰.

Besides these different definitions, one has started to prevail: the Smart Cities paradigm, as a huge amount of funding - national, international and EC - has been dedicated to this, thanks to the large number of stakeholders that will be catalyzed in the design, scaling up and replicability of the Smart Cities themselves.

It is a fact that the definitions of Smart Cities have changed over the years according to aims and goals of their proponents, the last definition being that proposed by EIP in Smart Cities and Communities - Strategic and Implementation Plan: «Smart cities should be regarded as systems of people interacting with and using flows of energy, materials, services and financing to catalyze sustainable economic development, resilience and high quality of life; these flows and interactions become smart through making strategic use of information and communication infrastructure and services in a process of transparent urban planning and management that is responsive to the social and economic needs of society»¹¹.

2020 and beyond

The White Paper on the future of Europe and the previous recent reflection papers have shown that the EU27 will face a wide range of challenges in the period leading up to 2025 and beyond. Among them are current trends that will remain relevant for decades to come, such as the digital revolution and globalisation, demographic change e social cohesion, economic convergence and climate change.

Sustainable development has long been at the heart of the European project. European societies today face many sustainability challenges from youth unemployment to ageing population, climate change, pollution, sustainable energy and migration. The 2030 United Nation Agenda for Sustainable Development and the sustainable development goals (SDGs) are an anchor of EU policy both internally and externally. The economic, social and environmental dimension at the heart of SDGs have largely been incorporated into the EU budget and spending programmes. They have been mainstreamed into the Europe 2020 strategy to build around education and innovation (smart), low carbon emissions, climate resilience and environmental protection (sustainable) and job creation and poverty reduction (inclusive).

As written above: many of the programmes that the EU promoted are now trademarks in the daily lives of European citizens.

Indeed, there is still room for improvement to further strengthen their performance and increase their impact, by avoiding overlap or combination of instruments and promoting alignment. The current generation of programmes have incorporated important reforms: they provide more funding on key European priorities such as employment, social inclusion, skills research and innovation, energy resource and efficiency, but policies have become increasingly complex to manage, hampering on-ground implementation and creating delays. The layers of controls and bureaucratic complexity make it difficult for beneficiaries to access these funds and deliver projects quickly.

Indeed, city planning activities have changed thanks to technological development and RD&I programmes. The budgetary constraints and the increasing complexity of urban investments for Smart Cities and Communities solutions have led city administrations to request the involvement of private players and to adapt the governance of cities in order to attract them. Therefore, Smart Cities evolve along with new modes of value creation through the intermediation of public-private partnerships, cross-sectorial collaborations, city-led “open innovation marketplaces” and other forms of governance.

Therefore, a much more radical approach to simplify implementation and favour more agile and flexible programming is needed for the future. The White Papers on the Future of EU Finance clearly states that hard choices will need to be made; the future EU budget should continue dealing with current trends that will shape the EU in the coming years plus additional new challenges (irregular migration and refugees, integration, control of external borders, security, fight against terrorism, common defence, ...).

According to this, five illustrative scenarios with different implications for the EU finance in terms of budget size, structure and degree of change/modernization have been described:

Carrying on: the EU27 continues on delivering its positive reform agenda;

Doing less together: the EU27 is doing less together in all policy areas;

Some do more: the EU27 allows groups of Members States to do more in specific areas;

Radical redesign: the EU27 is doing more in some areas, while doing less elsewhere;

Doing much more together: the EU27 decides to do more together across all policy areas.

So, which are the possible implications for RD&I on smart cities and smart specialisation strategies? It is clear that the way budget changes - and the purpose it is used for - largely depends on the type of future envisaged for European Union and on the level of ambition and trust that Member States will choose to adopt together to shape that future. In particular, as regards RD&I programmes this scenario will deeply influence EU funding togeth-

er with the SET Plan and the upcoming FP9 (Horizon Europe), where the most reliable idea seems to be a shift from the novelities of smart cities and smart specialisation strategies to a wider idea of Positive Energy District to pave the pathways towards 100 Zero-Energy and Positive Energy Districts in Europe committed by 2025, where PED could be a seeding point to showcase, in highly concentrated form, the integration and interoperability of technologies, systems and tools .

Conclusion

We assume that there is not a single way or a single approach to transform a city into a smart city; several cities in Europe have adopted different solutions, each of them reflecting specific circumstances. As illustrated in the article “EERA Joint programme on Smart Cities: storyline, facts and figures” the JP on SC is a huge and wide-ranging R&I network where members took part actively - at both national and international level - to develop, deploy and roll out European Smart Cities. Thanks to their contributions and to the commitment of several stakeholders to transform our cities into Smart Cities, is it now possible to figure out a European way to transition towards Smart Cities? Also, is it possible to say that there is a European vision about Smart Cities? And if so, can we say that there is a European vision for coming Smart Cities?

It seems to be a general opinion that there is not a single vision for the European Smart City, but there have been as many visions as there are Europeans, as social realities within Europe differ greatly, depending on where we live and work; that European cities want to be places of advanced social progress, platforms for democracy, cultural dialogue and diversity, places of green, ecological and environmental regeneration; last but not least, that Smart cities should be regarded as systems that catalyse sustainable economic development, resilience and high quality of life by making strategic use of information and communication infrastructure and services in a process of transparent urban planning and management. According to this, it appears that these three elements could be the synthesis of the European vision about Smart Cities.

As regards the European way to transition towards Smart Cities, we could say that during the last decade, cities have become smart not only because of automatic routine functions serving end-users, buildings, traffic system, energy providers and transport already in place, but also because data - which derives from ICT applications - have been used to understand, analyze and plan the city to improve efficiency, equity and quality of life for citizens. According

to this, we can foresee that the transition process which will pave the way towards coming smart cities will be mainly focused on the setting up, deployment, roll out and scalability of those smart solutions that have already been tested and experimented.

Applying smart cities solutions to limited-scale contexts has certainly enabled the testing of SCC technologies, governance models and citizen involvement; however, what is needed now, in the next future, is to ensure scalability and replicability of solutions, bearing in mind that «there is no single element that represents more than others an obstacle or an enabler to the roll-out of SCC solutions»¹². For the near future, we need to focus on similarities in smart cities RD&I projects (i.e. paradigmatic or technological enabling factors on which various solutions are based, ways to integrate single specific technology in a whole ecosystem of interoperable solutions, ...). If we see each SCC solution as a Lego Brick, we clearly realize that while each brick has been made as a separate object, it needs to be assembled and integrated in a more structured system.

Smart cities are now approaching a critical phase: after many theoretical discussions, it is necessary to create a realistic pathway of SCC applications/solutions.

Therefore, even the way of considering pilot RD&I projects will shortly change: not only a demonstration of technological effectiveness in achieving the desired performance or KPIs, but competitive business models with a high level of replicability and scalability, widely accepted by the largest group of stakeholders (government, RD&I networks, design and construction, real estate, urban services, e-commerce, analyst, ICT and Big data, process management, financial/funding, social/civil society, ...). This is really the most challenging step of this pathway: it must be more realistic, as it is necessary to select only some SCC solutions which come from ideas that have been elaborated in a conceptual expansion phase. Therefore, in the near future urban projects requirements will rapidly change and specifications will be more compelling, allowing no more single, isolated interventions as highly technological islands.

It is a fact that today we still do not have a smart city, or rather we have a smart city limited-scale context, but we have several SCC (Smart Cities and Communities) solutions where the use of ICT infrastructure promotes a better understanding of success factors for their deployment and roll-out.

Therefore, the next step to move towards a wider European idea of Smart Cities to come could be to deploy positive energy districts thanks SCC solutions - already experimented on a limited-scale context - as the most reliable opportunity.

NOTES

¹ The making of Smart Cities: best practice across Europe, EU Smart Cities Information System, Empowering Smart Solutions for better cities, DG Energy 2017.

² Cities that are getting smaller in size, thus contradicting global urbanization trends. The decrease in size is often a consequence of a drop in birth rates and/or the closing of larger industrial workplaces that have contributed significantly to the growth of the cities. Many shrinking cities make dedicated efforts to adjust to the demands of the knowledge society, in which the ability to generate growth does not necessarily depend on size; Huset Mandag Morgen, special edition on Futures of cities, may 2007, DK.

³ Cities that stand in the shadow of the most important city in a given country or region. The definition “second city” is increasingly used about cities that have defied their status as “provincial” in recent years, and have managed to assert themselves in the competition for resources and growth, in some regions and countries, the strong first cities feel overtaken and intimidated because the combination of smaller size and independence make second cities move faster than their larger counterparts; Huset Mandag Morgen, special edition on Futures of cities, may 2007, DK.

⁴ Cities that respond to the high pulse of the modern metropolis by launching concepts that slow down the pace. These will typically be cities whose layout and amenities support a lifestyle that prioritises recreational activity, the possibility of relaxing and enjoying life. A number of these cities have joined the “Slow City Movement” inaugurated in 1999 in the Italian city of Orvieto. The original incentive for this movement was “slow food”, the wish to increase the knowledge about and demand for this type of cuisine; Huset Mandag Morgen, special edition on Futures of cities, may 2007, DK.

⁵ Cities that are affected by great poverty. Such cities will typically have districts where the poorest citizens live in miserable conditions with no access to adequate health services, medical and social help, education, work, etc. These harsh conditions often make these districts appear as a threat to their surroundings: the enviroing communities typically react by sealing themselves off from the slum district, Huset Mandag Morgen, special edition on Futures of cities, may 2007, DK.

⁶ Cities that have made significant historic contributions to urban development. This definition is typically used for cities listed on the UN’s World Heritage List. It is also used to define cities that have historic sites, buildings, landmarks, etc. that have contributed to significant events in the world his-

tory, hereby profiling the city to the outside world. The primary challenge for cities in this category is to retain their historic distinction while still meeting the needs of modern citizens; Huset Mandag Morgen, special edition on Futures of cities, may 2007, DK.

⁷ Cities that are based on a mindset of sustainability and energy-efficient solutions with a view to reducing CO₂ emission and bringing down the consumption of energy resources. This is seen in different ways, for instance by having a well-functioning public infrastructure that ensures minimal use of cars in the city, and dense building with defined standards for building materials, design, etc. that are as environmentally friendly as possible; Huset Mandag Morgen, special edition on Futures of cities, may 2007, DK.

⁸ Cities that, according to WHO, are continually creating and improving physical and social environments and expanding community resources. These efforts enable citizens to mutually support each other in performing all functions of life and developing to their maximum potential. For an increasing number of cities, the healthy city model is seen as particularly valuable because it attracts resourceful citizens; Huset Mandag Morgen, special edition on Futures of cities, may 2007, DK.

⁹ Cities where citizens experience a special community feeling and interact closely with other people in their neighborhood. These cities create and maintain local values and ensure a sense of security for the individual citizen. They are characterized by strong cohesion that is defined by the citizens’ shared values and local attachment rather than by the functions the city is expected to fulfil; Huset Mandag Morgen, special edition on Futures of cities, may 2007, DK.

¹⁰ Cities whose primary purpose is to ensure a high quality of life for their citizens. Their efforts range from high health standards to local initiatives that ensure a dignified life for all citizens. The latter is achieved by providing sufficient opportunities for education and work. It requires a balance between public and individual needs. Through their organization and physical layout, these cities wish to guarantee safety and security while ensuring that the individual citizen feels free and content as a member of a larger community; Huset Mandag Morgen, special edition on Futures of cities, may 2007, DK.

¹¹ EIP on Smart Cities and Communities - Strategic and Implementation Plan, 2013.

¹² Analysing the potential for wide scale roll-out of integrated SCC solution - Final Report, 2016.