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SME4SMARTCITIES

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Table of Contents

Executive Summary

The Urban Challenges Identification Survey was designed to find the current state of awareness and approach to the implementation of innovative practices and solutions and of environmentally sustainable initiatives in both large and small cities across the Mediterranean. It was also designed to find both existing challenges and barriers, the initiative and solutions that were applied and key factors to overcoming the challenges and to increasing the prospect of successful implementation of innovative solutions.

Together with the Current Procurement Trends Guide research and the study of existing solutions by innovative SMEs, this study lay the ground for cities and SMEs discussions, learning and collaboration initiatives that will lead to the actual implementation of pilots in participating cities.

The survey finds a high level of awareness and will, which is impaired by specific challenges that have an horizontal effect across the board, resulting in a gap between city needs and the actual implementation of innovation and sustainable solutions. This gap is evident in most environmental and urban concern areas, with the sole exception of sustainable energy in which a breakthrough effort is evident.

A summary of the survey results leads to recommendations to increase the readiness to embrace innovation and sustainable solutions which can be put to the test and practically implemented by Mediterranean cities and SMEs in the next phases of the SME4SMARTCITIES project.

1. Introduction

As cities continue to grow, so is the number of challenges they are facing. Emerging environmental, economic or social issues call for new and unproven urban solutions.

Local and regional authorities account for about 44% of public procurement spent across Europe, and as much as 83% in Spain and 75% in Italy.[1] Approximately 55% of contracts awarded by such authorities are for services and a smaller number are for works and supplies contracts. Social services, IT supplies and services, environmental and waste management, transport and construction-related services, account for a large proportion of local authority contracts.

1.1 Smart Innovation for Urban Efficiency and Resilience

In a changing, challenging world, new approaches and creative initiatives may be needed to maintain current services and to increase social, economic and environmental well-being, while mitigating growing demands, growing complexity and changing environments. The adoption of innovative products or services allow cities to implement new solutions to support urban resilience and sustainability. Areas where smart Innovation is of high benefit to cities and residents are widely diverse, including mobility, energy, water, food, waste management, ecology, urban nature, climate, circular economy, sharing economy, citizen engagement and education. Innovative solutions offer new technologies and digital services for the public administration, sensors and control systems for municipal logistics, architectural methods for improved building, natural solutions for urban ecology and agriculture, as well as a wide spectrum of innovative solutions in other areas as well.

1.2 The concept of Smart Cities

The emerging concept of “Smart Cities” and the flood of related publications and events (such as Smart Cities Expo World Congress in Barcelona and DLD Tel Aviv Conference) hint that there is a surge of cities that are busy renovating and improving their management tools, infrastructure and services. The “smart city” concept is calling for action – replacing established structures and technologies that are no longer sufficient with new

[1] OECD (2018) *Key Data on Local and Regional Governments* in the EU, p 9.

ones, cutting costs using new tools, initiating sustainability-oriented projects. This call for action is answered with case studies, success stories and awards to leading cities.

But has this call for innovation really spread across all cities?

Some cities are highly proactive in pursuing “smart cities” practices while other municipalities are watching. A myriad of publications, announcements and events are providing much information but they may also make municipalities confused. There are many different definitions and concepts of smart cities. What is really a smart city? Is it all about adopting new technologies? Big-data analysis? Sensors and IoT? or is it related to creating a better urban experience such as walkability and healthy environment? Maybe “Smart Cities” are cities that are very efficient and thus save costs? Or maybe they are cities that can mitigate and adapt to climate change? Improve public health? citizen satisfaction? Social and educational experience? The variety of possibilities is daunting and the confusion may lead to failed initiatives, disillusionment and frustration. Some cities explore this puzzle on their own with innovative vigour, other join efforts in organizations, while others might be far away behind.

A city is a complex ecosystem. Many aspects of it are related and interdependent. cities will be smart to adopt “smart city” concepts, if they really contribute to make the cities more livable, healthy and sustainable. There are indices and measurements to the smartness of cities – to improvements in efficiency, security, digital services, mobility, operations, air quality, waste reduction. The indices are useful for finding the strong areas and the weak areas. They are good for a comparison between cities but still the understanding of what a smart city really is still differs widely.

1.3 Innovation Ecosystems

While urban innovation can be applied by openness to new ideas and products and by the adaptation of innovative and sustainable procurement practices, cities also go further by nurturing innovation and entrepreneurship initiatives within the city and by integrating an innovation ecosystem.

A core European model for a “smart city” framework, The European Smart Cities Model 3.0, supports the creation of an innovative urban ecosystem by identifying six dimensions of engagement and development - smart governance, smart economy, smart mobility, smart environment, smart people and smart living. This

model is the result of the "Smart cities – Ranking of European medium-sized cities" report by the Centre of Regional Science at the Vienna University of Technology, the Department of Geography at University of Ljubljana and the OTB Research Institute for Housing, Urban and Mobility Studies at the Delft University of Technology. On the basis of this study and of the resulting model, Caragliu et al. have suggested that a city can be considered smart "when investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance".

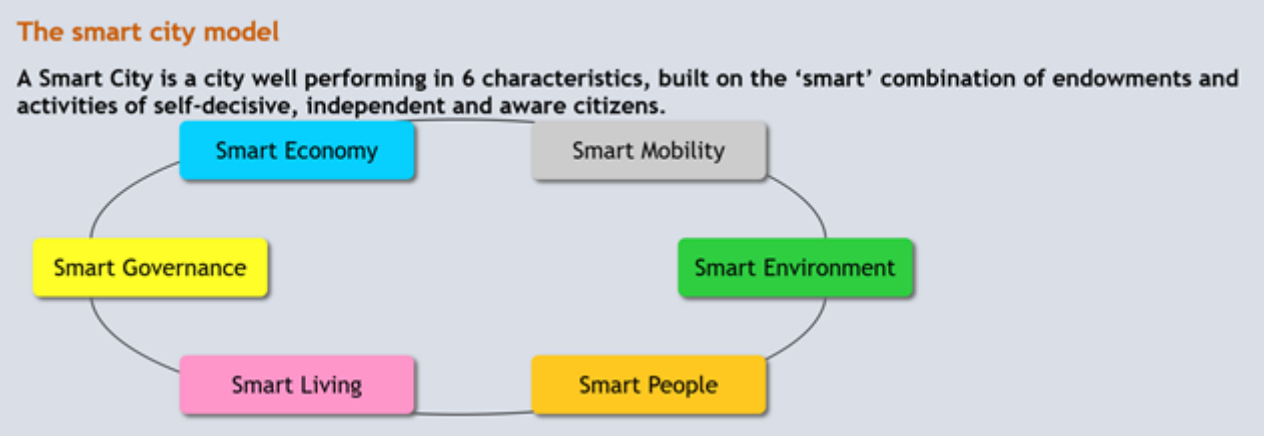

Figure 1: the European Smart Cities Model 3.0 (2014)[2]

A similar approach is presented by the British Standards Organization in the PAS 180 Smart cities Vocabulary[3] while making a distinction between Enabling concepts and Applications. The enabling concepts are 1) Smart city systems; 2) Public and private service delivery models; 3) Resource management processes; 4) Technology and infrastructure; and 5) Governance. The applications (output channels) are 1) Environment; 2) Finance and economy; 3) Mobility; 4) Community, education and skills; 5) Lifestyle, health and well-being.

To enable cities to develop an ecosystem that nurtures creativity and innovation, Zygiaris[4] suggests a 7-layer framework model that demonstrates the interdependencies of the required environment and

[2] Developing innovative solutions for Mediterranean smart cities: launching of the SME4SMARTCITIES project

[3] BSI, PAS 180 Smart cities Vocabulary, https://www.bsigroup.com/en-GB/smart-cities/Smart-Cities-Standards-and-Publication/PAS-180-smart-cities-terminology/

[4] Zygiaris Sotiris (2013), Smart City Reference Model: Assisting Planners to Conceptualize the Building of Smart City Innovation Ecosystems Journal of the Knowledge Economy volume 4, pages 217–231, https://link.springer.com/article/10.1007/s13132-012-0089-4

infrastructure. The first layer on top of the underlying structure of the built city is the green city layer - health and quality of the environment, sustainable buildings, energy and transportation services that are all needed to work together and to be designed according to environmental guidelines and standards to keep the urban environment healthy. Urban nature, accessible and sustainable natural resources and climate-neutrality are the basic requirement for resident quality of life. Upon this mandatory level, the services and technology levels can be built, starting with the interconnection layer and building on top of it the instrumentation, open integration, application and innovation layers.

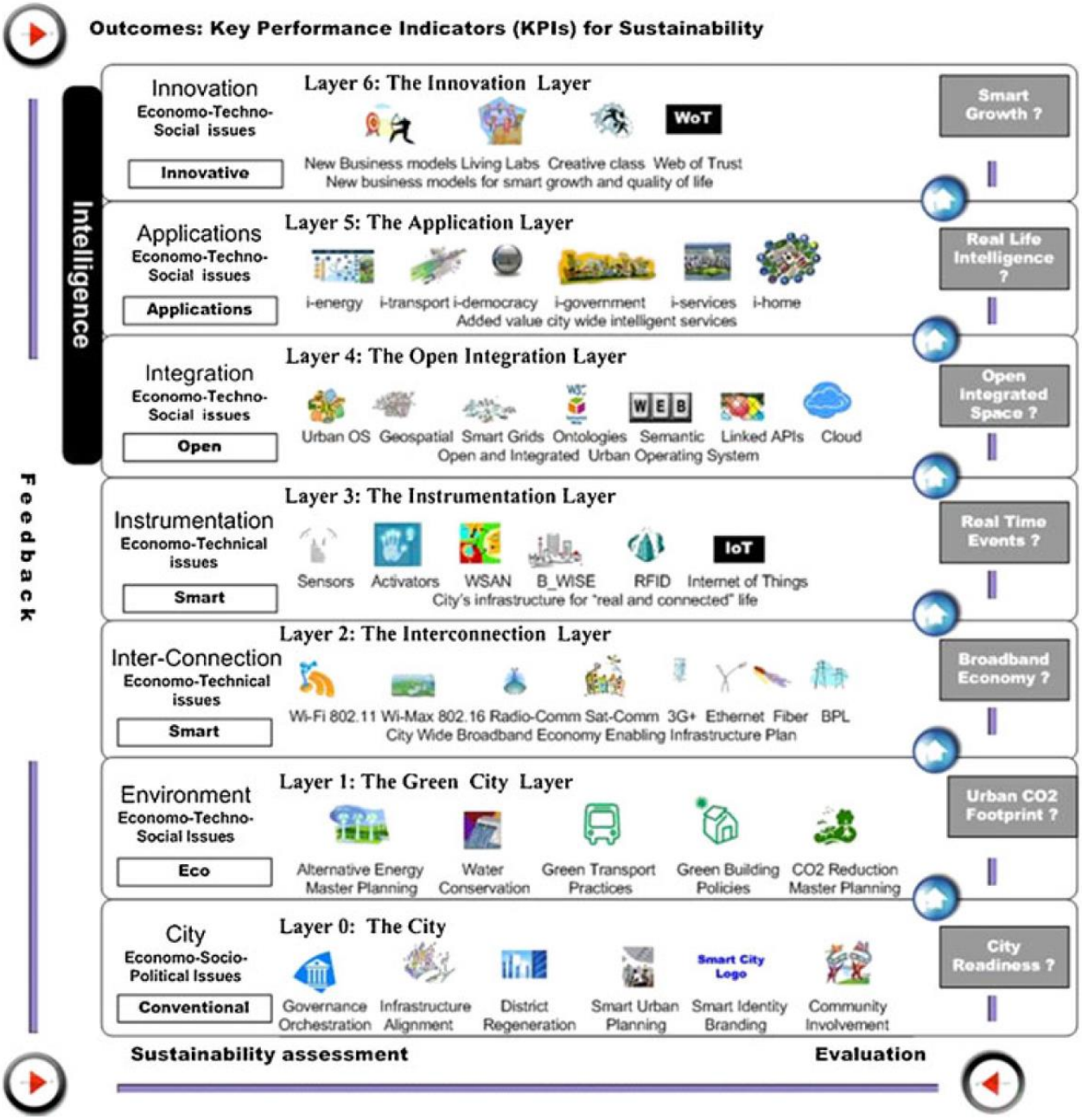

Figure 2: Zygiaris, Smart city conceptual reference model

A similar multi-tier model is suggested in the Smart Sustainable City ICT Architecture model by the International Telecommunication Union (ITU) Focus Group on Smart Sustainable Cities[5] [6]. In the image below, the tiers are shown top to bottom with the natural environment as tier 1 and soft infrastructure (people, communities, data, software) as tier 5.

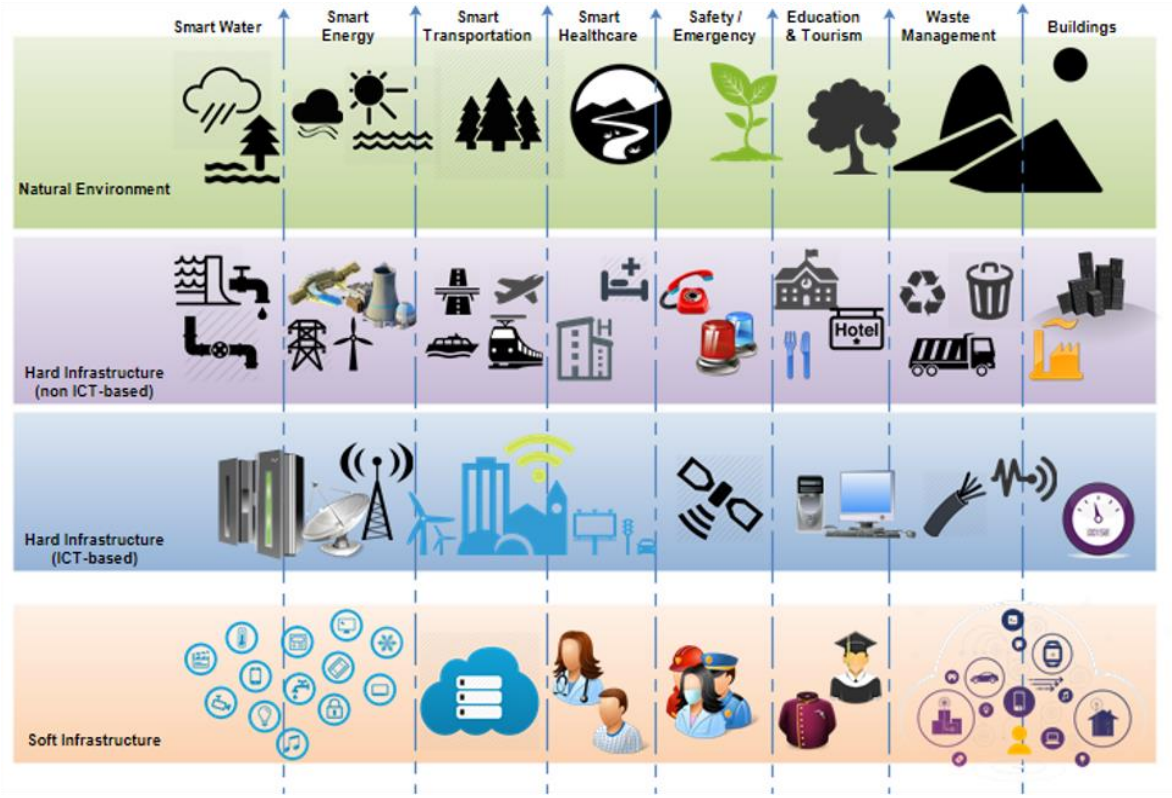

Figure 3: Multi-tier smart sustainable city ICT meta-architecture

All models show that all components of city structure and urban life are closely inter-related and linked. Technology and nature are not two distinct and remote world but they are integrated and interdependent. A

[5] International Telecommunications Union (ITU), Technical Specifications on "Setting the framework for an ICT architecture of a smart sustainable city" (SSC-0345), 2015, https://www.itu.int/en/ITU-T/focusgroups/ssc/Documents/website/web-fg-ssc-0345-r5-ssc_architecture.docx

6 Anthopoulos, L. (2015), Defining smart city architecture for sustainability. In *proceedings of 14th electronic government and 7th electronic participation conference (IFIP2015)* (pp. 140-147)., https://www.researchgate.net/profile/Leonidas_Anthopoulos/publication/277958808_Defining_Smart_City_Architecture_for_Sustainability/links/55e0385908ae6abe6e86dc58/Defining-Smart-City-Architecture-for-Sustainability.pdf

green healthy environment is the basis on which technological and economic enablers can be built, without disrupting the environment, to enable the smart residents of the city to spark innovation.

1.4 Green Procurement

Green Municipal Procurement is the preference for environmentally friendly and sustainable goods, services and technologies, to alleviate environmental, residential and public health issues that increasingly affect cities today and to contribute towards sustainability goals. A basic approach can be to look for low environmental and health impact, but Green Municipal Procurement should focus on the full life-cycle cost and on sustainable production and reuse processes. considering the full life-cycle costs of a contract, rather than the purchase price, provide financial savings for public authorities as it lowers operational, maintenance and product-end-of-life costs.

Therefore, Green Public Procurement (GPP) guidelines includes life-cycle costing, specification of sustainable production processes, and use of environmental award criteria to help contracting authorities identify environmentally preferable bids. The concept of Sustainable Public Procurement (SPP) includes both environmental and social criteria in purchasing decisions. European DIRECTIVE 2014/24/EU[7] enables public authorities to take environmental considerations into account. The European Commission Green Public Procurement (GPP) guidance provides an overview of the legal framework for public procurement, with criteria and guides for implementation of GPP[8], which include environmental and social[9] considerations. A detailed list of EU policies, strategies and legislation related to green public procurement can be found in the Annex to the "Buying Green" handbook[10].

Green Municipal Procurement is a major driver for innovation, providing industry with real incentives for developing green products and services. It also provides financial savings for public authorities. The result is a win-win positive cycle for both public authorities and for SMEs.

[7] for entities operating in the water, energy, transport and postal services sectors directive Directive 2014/25/EU is of more relevance.
[8] Commission guidance - GPP - Environment
[9] DG Employment, Social Affairs and Inclusion website
[10] A handbook on green public procurement 3rd Edition

1.5 The adoption of Innovative and Green Offerings

The business market is bustling with new innovative offerings, in the hi-tech, cleantech, mobility, agritech and other industry sectors. But how do municipalities react to this overwhelming range of creative offerengs? Are they open to embrace innovative products? Do they have the capacity to do so? Can they be confident they can make the right choices for their cities?

Today, some municipalities have appointed dedicated innovation managers, sustainability managers and established units that proactively seek and embrace innovative initiatives to improve logistic operations, services and citizen quality of life. Their agenda involves not just landscaping and waste collection, but environmental development and local sustainability goals. Municipalities publish tenders, calls for proposals, build innovation centers and host events such as hackathons[11]. Cities also participate in European Projects such as the Interreg Europe BETTER project[12] and Pure Cosmos project[13], that develop highly integrated approaches to cut costs and improve the quality of public administration while improving the effectiveness of public support for SMEs by reducing regulatory complexity, bureaucracy and uncertainty for the development of SMEs.

But still, a big question looms. How much do cities feel ready for environmental innovation? do municipalities actually embrace innovation and green procurement tools and directives? Do they engage with innovators and SME companies in cities across the Mediteranean? Do local authorities at large really have increasing interest and openness to innovative and environmental ideas and initiatives or are they stifled by established habits and bureaucracy? Do they feel they have the knowledge, the skills to actually find the right solutions that are appropriate for their needs and can they actually implement and execute specific solutions in a successful manner?

1.6 The Value of SMEs

In the EU, an SME is defined as a company with less than 250 employees and either turnover of up to €50 million or a balance sheet total of up to €43 million.

[11] SME4SMARTCITIES, Current Municipal Procurement Trends Guide for Municipal Procurement Leaders, https://sway.office.com/rqs2QYXAgaa0MOtR

[12] Interreg Europe - BETTER

[13] Interreg Europe - PURE COSMOS

A recent EU-level study of SMEs in public procurement found that 65% of contracts valued above the EU threshold and 86% of below-threshold contracts were won by SMEs.[14] However, only 33% of the value of above-threshold contracts was won directly by SMEs, with a further 16% estimated via indirect participation.[15] Rates of SME participation in public tenders vary widely between European countries, with Lithuania, Greece and Malta having the highest rates and Italy, Spain and Portugal the lowest.[16] Interestingly, SMEs appear to be only marginally more successful at winning local or regional authority contracts compared to those awarded by central government, utilities, or other public bodies.[17]

The increasing need for urban innovation will result in the development of a significant number of initiatives, creating new business opportunities for Mediterranean SMEs. Today, some initiatives to promote SME access to tenders are aimed at domestic or local SMEs, while others are open to SMEs from any country.

2. The Study

The SME4SMARTCITIES research project ("Mediterranean SME working together to make cities smarter") was planned to answer the questions outlined above and to address smart cities challenges for the purpose of achieving a more sustainable, efficient and smart urban growth. This requires the identification of challenges, barriers and opportunities for innovative and environmental development in urban areas and to connect local authorities to businesses and small and medium-sized enterprises that can help to promote sustainability and innovation.

To achieve these goals, the project started by studying the current state of municipal innovation, environmental development and procurement, as the basis for continued action research and for initiatives to enhance collaboration between cities and SMEs by strengthen and supporting networks, clusters, consortia

[14] European Commission DG for Internal Market, Industry, Entrepreneurship and SMEs (2019) *Analysis of SMEs participation in public procurement and measures to support it – Final report*

[15] Figures which contrast the value of public sector contracts won by SMEs with their overall contribution to GDP can be misleading because many SMEs provide goods or services which are not the subject of public procurement, for example small shops, restaurants or personal services. In many cases, SMEs act as subcontractors or non-lead partners, but this information is not captured by most tender databases.

[16] *Ibid*, p 20.

[17] *Ibid*, p 50

and value - chains, creating business opportunities for SMEs and promoting economic and social development with a Euro-Mediterranean focus[18]. For our cities to be more efficiently managed and more livable, public authorities and SMEs can work together to come up with the best technological, environmental and social solutions. Therefore, the goals of the SME4SMARTCITIES project are to make this collaboration possible by reinforcing the capacities of Mediterranean cities and SMEs - helping cities to be the front-runners of innovation and supporting Mediterranean SMEs to ensure that their products and services meet the expectations and needs of smart cities.

The SME4SMARTCITIES research project is an initiative of ENI CBC MED, led by a consortium of 6 organizations from across the Mediterranean, which includes our team at the Laboratory for Urban Innovation and Sustainability, at the Department of Environmental Studies, Porter School, Tel Aviv University. ENI CBC Med ("Mediterranean Sea Basin Programme") is the largest Cross-Border Cooperation (CBC) initiative implemented by the EU under the The European Neighbourhood Instrument (ENI)[19].

Figure 4: Launch of the SME4SMARTCITIES research project, an initiative of ENI CBC MED[20]

[18] [SME4SMARTCITIES] Intelligent Cities Challenge

[19] ENI CBC MED - The Programme at a glance

[20] Developing innovative solutions for Mediterranean smart cities: launching of the SME4SMARTCITIES project

Within the scope of the SME4SMARTCITIES project, we conducted an Urban Challenges Identification Survey to find the current state of municipal innovation, environmental development and sustainability readiness in Mediterranean Cities. This study seeks to assess the potential for collaboration between municipalities and businesses to promote smart innovation, urban well-being and sustainability. Municipal Innovation.

2.1 Main questions and hypothesis

The main research questions were:

1. To which extent do Mediterranean cities feel ready for urban and environmental innovation

2. Do they encounter major challenges in applying urban and environmental innovation

3. In which areas have municipalities implemented innovative, sustainable solutions and in which areas there is a gap between needs and actual practice

Therefore, we have sought to find whether municipalities seek innovative, sustainable, "green" services and products. If they do so, what experience do they encounter? Do they find barriers or new opportunities? Is it easy for municipalities to find new smart innovative and sustainable services? And is it easy for the businesses, that provide such services, to find municipal attention and readiness for actual procurement and implementation?

2.2 Study Methods and Sample

The Urban Challenges Identification Survey was conducted over a period of 9 months, from Dec 2019 to August 2020. To identify barriers, challenges, development trends and initiatives, a mixed-mode questionnaire with both Lickert-type questions and open text questions was used.

36 representatives from 34 cities participated in the survey, either by in-depth interviews or by online questionnaires in the respective languages (English, Spanish, Italian and Hebrew). Results from both channels were integrated into the study database.

Only replies of Mediterranean cities with more than 20,000 inhabitants, with had full text replies, were admitted into the study sample (e.g. cities that responded with limited textual input or focused mainly on COVID-19 limitations, were not included in the study).

Participants were municipality officials with varied roles, including one Mayor, one Mayor Deputy, CEO, VP of operations, 6 Innovation managers, 4 Environment managers, 2 IT managers, Engineering manager and municipality project managers.

Some of the participating cities have requested to keep their individual replies confidential while others have agreed to openly share individual replies. Therefore, all data will be kept confidential and will be only aggregated statistically, except for a few case studies and specific remarks by participating cities who have explicitly agreed to cite them.

34 cities have participated in the study, from El Puerto de Santa Maria in southern Spain to Eilat in southern Israel. 17 of the cities (50%) have less than 100,000 citizens and 17 cities have more than 100,000 citizens, With the following distribution:

- 9 cities under 50,000 citizens (28%)
- 8 cities of 50,000-100,000 citizens (22%)
- 12 cities of 100,000-500,000 citizens (38%)
- 4 cities are of 500,000-1,000,000 citizens (9%)
- 1 city is of more than 1,000,000 citizens (3%).

2.3 Results

Representatives of the participating cities presented a broad picture that ranged from lack of awareness to a range of innovation initiatives. There is much interest in adopting innovative solutions in a variety of areas such as strengthening the local economy, sustainable environmental development and developing entrepreneurship in the city area. Approx. 20% of the authorities are working to develop innovative and large-scale environmental initiatives. Yet, other authorities have described barriers that hinder such initiatives.
The following sections describe the findings in more details.

Challenges and Barriers

The participating city officials have shared challenges and barriers that they face in implementing innovative and green procurement approach and initiatives, by both a quantitative Likert-type questionnaire and

qualitative open text articulation. Likert-type results are represented by a median value with mean ± Standard Deviation in parentheses, in a 1-5 scale (1 = never, 5=always).

The city officials have mostly claimed that they were successful in implementing sustainability solutions (4 (3.57±0.71)) and that they have good collaboration with Local Businesses (4 (3.55±1.07)) but they have only medium success with Green Urban Innovation (3 (3.24±0.76)), Smart City practices (3 (3.32±1.07)), green procurement (3 (2.92±0.81)) and innovative practices such as nurturing CleanTech (3 (2.86±1.09)) and circular economy (3 (2.78±1.09)).

Top barriers for innovation were Bureaucracy (4 (3.83±0.86)) and legislation (4 (3.64±0.86)), followed by coordination between departments (3.5 (3.22±1.22)), Coordination between officials (3 (3.14±1.25)), Operational processes (3 (3.06±0.86)) and tradition (3 (2.92±0.98)). The municipal leadership (2 (1.17±0.93)) and citizen behaviour/engagement (2 (2.47±1.02)) were not considered as barriers.

Interestingly, In smaller cities (below 100,000 citizens), the coordination between departments (4 (3.21±1.21)), citizen behaviour/engagement (3 (2.63±1.01)) and National law (4 (3.68±1.07))were considered to be slightly larger barriers than in larger cities (above 100,000 citizens) - (3 (3.00±1.36)), (2 (2.35±1.13)) and (3.5 (3.05±1.07)) respectively. There have been no notable differences between larger and smaller cities on other parameters.

Smaller cities have also reported slightly less engagement and success in the implementation of sustainability initiative (3 (3.40±0.63) compared to larger cities (4 (3.70±0.75). This can be attributed mainly to four large cities (out of the total sample of 32 cities) who have claimed they constantly implement sustainability policy and initiatives to no city below 100,000 who have reported such achievement. The same holds for smart city practices - 4 (3.65±0.95) in larger cities vs. 3 (2.95±1.03) in smaller cities.

There results reveal the subjective estimates and perceptions of managers. They are not "technical" data measurements. Therefore, they may indicate a certain level of difficulty, lower levels of confidence and readiness of smaller authorities and probably also of a slightly lower level of internal collaboration which data measurements of city data could not unveil.

Top barriers to advance smart initiatives

In the qualitative open text survey, the participating city officials have openly expressed challenges and barriers that they were facing, as can be seen in the chart below.

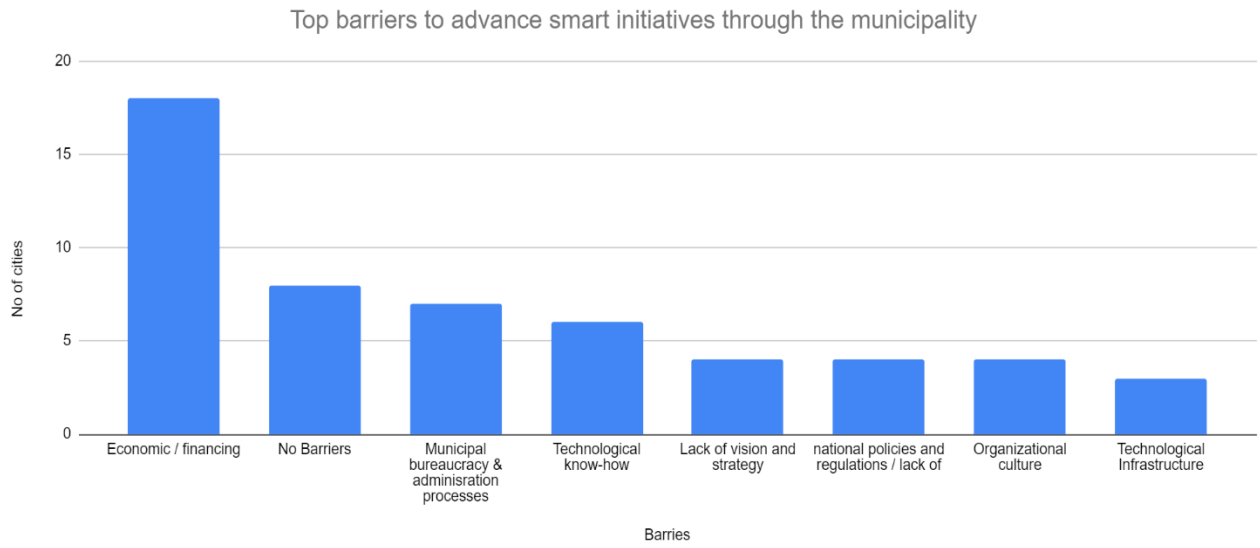

Figure 5: Top barriers to advance smart initiatives

A most prominent barrier that emerged was the need for funding sources for implementing innovative and environmental initiatives. For authorities that are dependent on budget for ongoing operations and maintenance activities throughout the year, it is difficult to allocate resources to large development initiatives. This is even though there are many channels for economic backing that are provided by government authorities and public organizations, tenders and EU programs. There are self-financing channels of operation such as energy efficiency and installation of solar energy systems which can generate large revenues at the disposal. As an example, cities in Israel and in many EU countries are working vigorously to establish electricity generation systems in their territory. Eilat is also a leader in the transition to renewable energies. Kfar Saba is setting up dozens of solar systems on the roofs of public buildings, in a process of public participation and strict control over the efficiency and safety of the systems, to generate revenue and to become an energy self-sufficient city. in Jerusalem, a solar electricity system has been set up on top of the Teddy Football Stadium.

Other challenges and barriers were the lack of up-to-date professional knowledge, complexity of organizational processes, bureaucracy and legislative barriers, and to a smaller extent also issues of vision and strategy, municipal work culture and technological infrastructure.

Figure 6: Innovative use of sports ground for the production of solar-based electricity, providing a win-win solution with revenue for the municipality, safe sun-shielding for the comfort of basketball players, increased energy independence and decrease of CO2 emissions and air pollution in Kfar Saba.

Environmental Issues and Applied Solutions

It is most interesting to note that when asked to pinpoint major challenges and barriers, participants described "horizontal" issues that cut across all activities and have a wide effect as discussed above. They did not describe specific areas such as electricity, air quality or waste but rather issues of funding, knowledge, work processes and work culture. However, they also shared the areas with most environmental issues and the initiatives and actual projects that the cities have taken. Both lists are summarized in the following 2 tables.

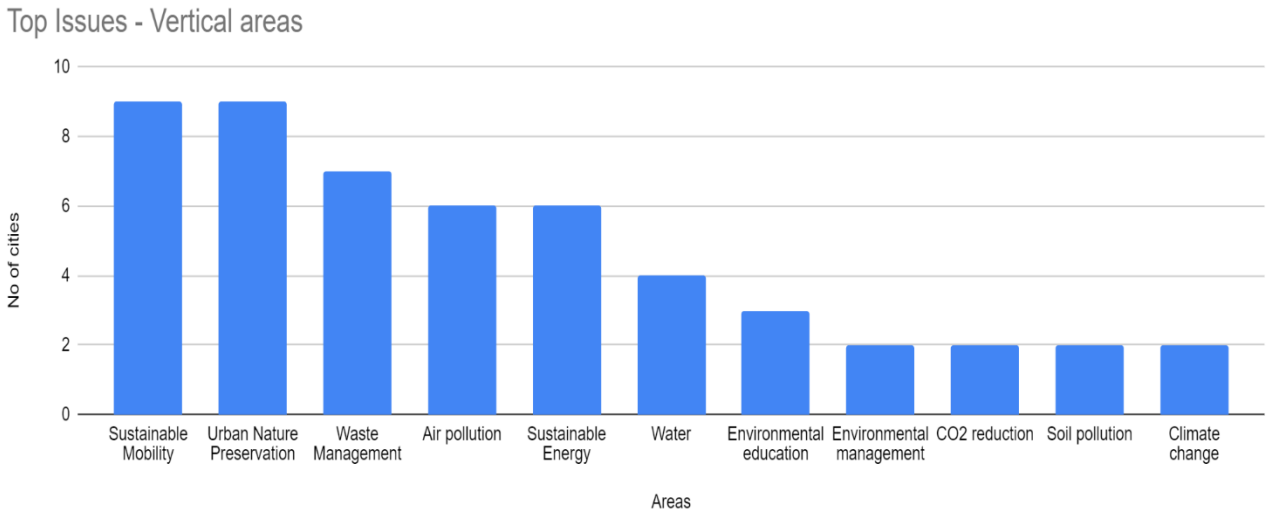

Figure 7: Top areas of environmental issues

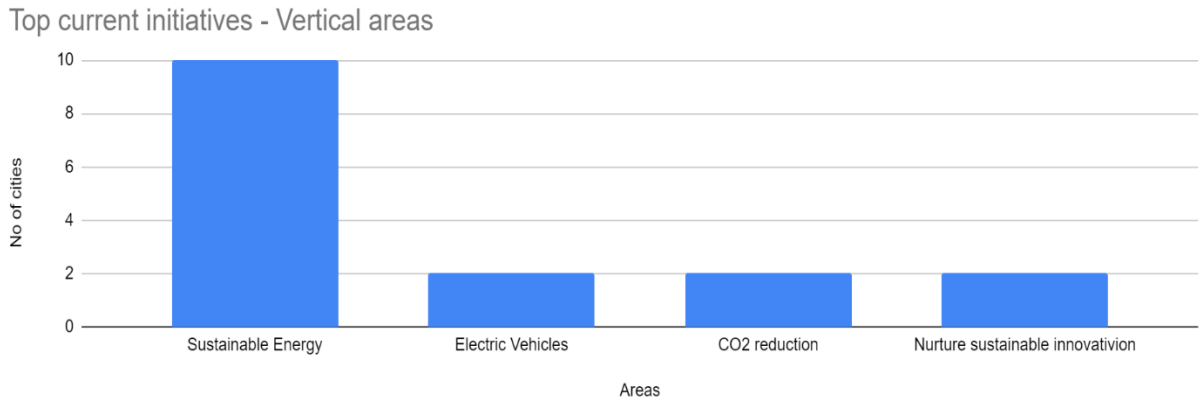

Figure 8: Top areas of environmental initiatives

These findings show an array of common areas that repeat - Sustainable mobility, Urban nature, waste management, air quality and energy in a gradual decreasing order. These areas are followed by environmental education, which related to increasing awareness and engagement of both citizens and municipality workers. Additional areas were mentioned by only one or two municipalities.

when comparing the environmental areas of top issues to the top areas of implemented solutions, a remarkable gap was revealed. While a wide list of problem areas was presented, the majority of actual initiatives were in the areas of sustainable energy and of mobility, with an emphasis on the introduction of electric vehicle solutions. While sustainable energy ranked no. 5 on the list of issues, it was ranked no. 1, with

a significant gap over other areas in solution initiatives. This gap may show that sustainable energy receives a high level of attention and engagement and that many municipalities have already solutions in work. Other areas however, require much attention and engagement to provide adequate solutions to cities - mostly urban nature preservation and nurturing, waste management, air quality and sustainable mobility, in decreasing order of the gap between issues to solutions. These are the top environmental areas where SMEs engagement can be of much value to the municipalities.

Barriers to working with SME and Start-ups

The majority of cities reported no barrier to working with SME and start-up companies, though some cities reported challenges due largely to legislation and ethics (such as complex tender processes and anti-corruption laws), financial resources, bureaucratic processes and openness to change of the administration organization.

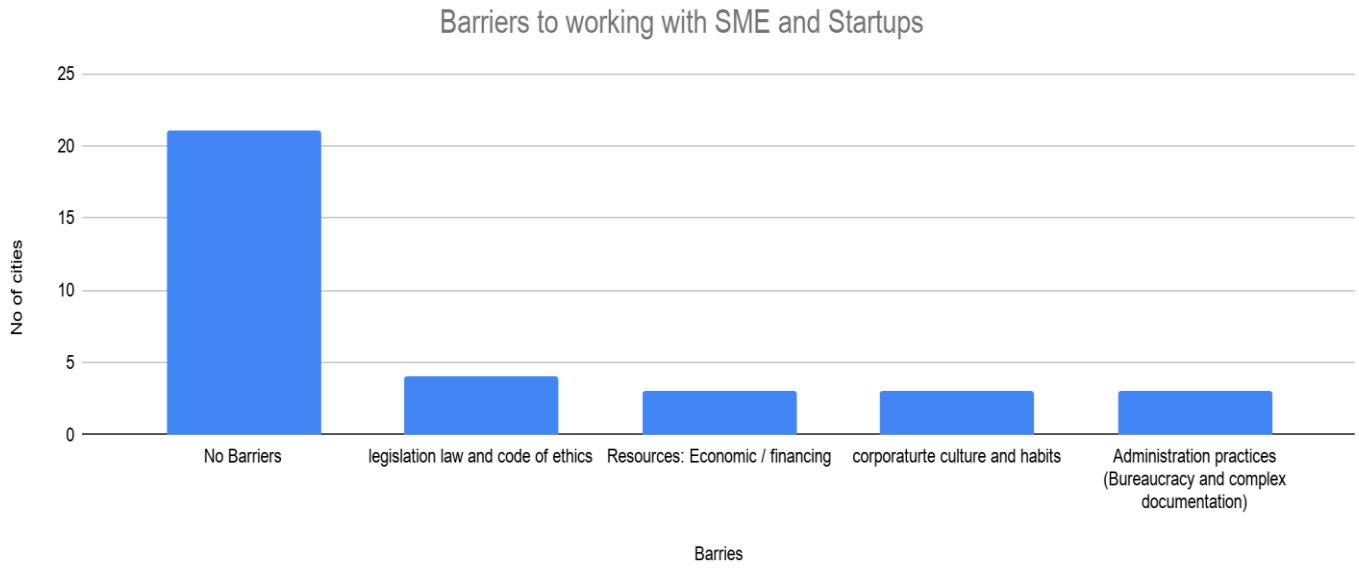

Figure 9: Barriers to working with SME and Start-ups

Key factors to smart innovation succeed in the city

The key factors that have emerged as essential to embrace innovation and to adapt sustainable development practices and initiatives are the leadership of the mayor and the director general of the authority, establishing a role of a leading mufti-disciplinary director that will work in collaboration with all municipal departments, hiring a professional staff, public participation and public relations. Developing a mental awareness of green

innovation, leadership discovery, training and communication lay a clear path to success. Much can be learned from the success of Mediterranean authorities that have already paved the way.

Survey respondents have described varied key factors for smart innovation. It was evident that multiple areas are required to take into account. The top themes that emerged are summarised in the table below. Some key factors echo the challenges and barriers that were discussed earlier such as economic resources, up-to-date technological understanding for the municipalities and adequate knowledge of procurement processes, tenders and administrative jargon for the SMEs. Actually – a knowledge and understanding barrier between "Tech" language and "administrative" language.

Other top key factors that emerged were the prime importance of the city mayor and CEO leadership, clear vision and organization within the municipalities (noted by 18% of cities as a top key factor) and the establishment of public/private contact networks and collaboration, which include SMEs, local stakeholders, research institutions and the municipality teams (also noted by 18% of cities as a top key factor).

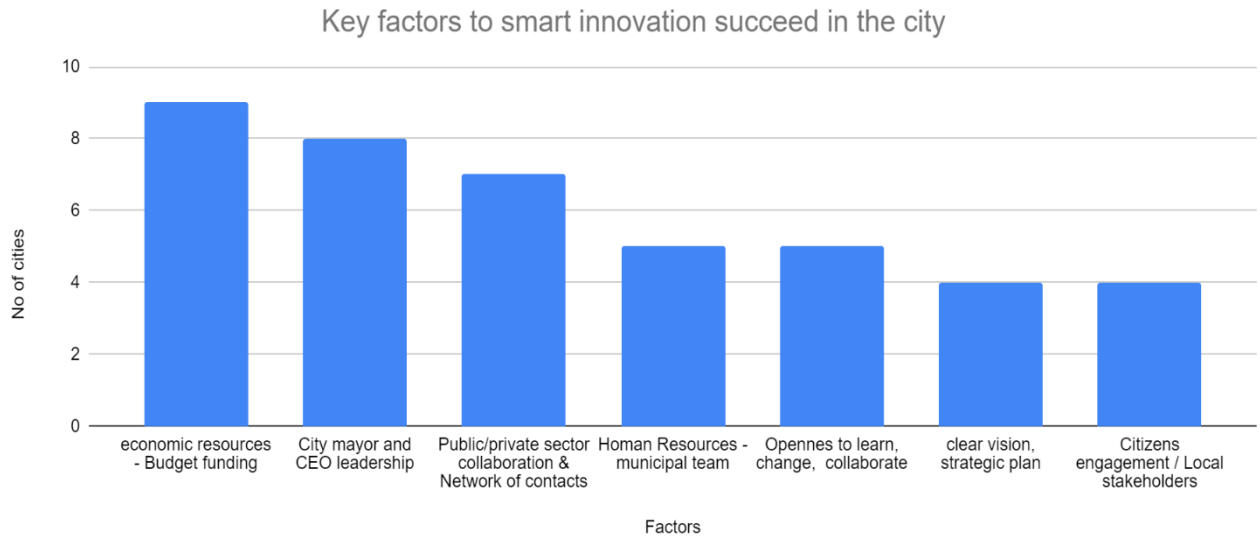

Figure 10: Key factors to the successful embracing of innovation in municipalities

3. Summary

Readiness to Embrace Innovative and Green Solutions

The participating municipal authorities have described economic, social and environmental issues and a need to solve these issues. They demonstrated an interest in innovative solutions and sustainable initiatives to address these needs. Yet despite the positive approach, challenges and barriers were reported, and a gap was found between the expression of issues and the implementation of solutions for these issue. This gap is a major opportunity for the municipalities and for innovative SMEs to work together to plan and implement appropriate solutions. As the study found very few barriers for working with SMEs to find appropriate solutions, overcoming the reorted barriers can open the way for successful engagement.

Overall, we found that the concerns of becoming “smart cities” are about capacity rather than technology. Cities have difficulty in creating an innovation-oriented climate because of limited resources, knowledge and communication issues and because of the effort required to drive change. However, the COVID-19 crisis have shown how quickly authorities can re-organize, adapt and respond in a most impressive way. When in crisis, barriers fall.

In addition to the initiatives of leading innovative cities such as Barcelona, Genoa, Kfar Saba, Herzliya and Tel Aviv, other cities show desire to embrace innovation and use it for their benefit. large cities are more open to risk taking, show slightly better communications and collaboration between departments and slightly better citizen engagement than smaller cities. Still, small cities show initiatives and readiness to participate in national and regional programs. In discussions with mayors of small historical towns in Italy, where many town with 1000 to 7000 inhabitants are abundant along rural roads, the mayors expressed that they participate in regional sustainability and environmental collaboration initiatives and they are open and willing to embrace more.

A Path to Resolve Challenges and Barriers

The main barriers relate to financial resources, human resources and communications. Emphasizing communication, collaboration and learning, fuelled by political will and a mental climate for green innovation, led by the mayor and CEO and assisted by an integrated professional municipal team that work in open collaboration across the municipality, reveals a road to resolve the challenges.

Sharing up-to-date knowledge, skills and nurturing a sense of ability, can be done relatively easily because enough experience and knowledge has been gained because and there is a wealth of case studies, solutions, initiatives and city groups that can be joined. Cities can learn by direct experience and by the experience of other cities. These are catalysts for overcoming the barriers. We already seem to have entered the second wave of municipal innovation adoption. The pioneers have already shown the value. Now is the turn of more cities to reap the benefits. If there is the political will and understanding that every authority has great human, social, economic and environmental potential, the way is paved for innovative and environmental solutions that will yield great benefit.

With that core enablers in place, economic, social and environmental goals can be achieved. Enabling factors can then be created and applied to provide incentives and overcome challenges. The remarkable breakthrough of renewable energy solutions that we have found in the survey can be a great example -. When there are dedicated funding sources (Funds, Government Ministries, EU programmes), directives and regulations, professional knowledge, mature products and services, and municipal leadership (mayor, CEO), we see a ramakable achievement and successful implementation.

Collaboration between cities and especially between stronger, experienced innovative cities and less experienced cities have a large potential for both cities. This can be achieved in a cluster or regional model. Similarly, collaboration between solution providers to create clusters of innovative, sustainable solutions to the needs that cities communicate, can make it easier to cities to find and implement solutions. Instead of competing and creating a sense of overwhelming confusion, they can suggest an integrated solution.

Discourse, communication, open mind and open will engagement within and between municipalities and between them and external SMEs can bridge the gap. Training, bridging the tech-administrative language gap with practical, applied, positive, collaborative approach. Together, this is a huge opportunity for sustainable development and for the flourishing of local and regional SMEs. None of the survey participants have expressed they have no time or no need for innovation and for a development of a green environment. Many did express the lack of enough up-to-date knowledge and of economic resources to do so.

If cities and SMEs work together to resolve the major “horizontal” challenges, they may enjoy a beneficial break-through in the “vertical” areas such as mobility, urban nature, local economy and resident welfare.

Summary

The survey results show an open mind and open will by municipalities across the Mediterranean. Several municipalities show successful initiatives, but many challenges, barriers and gaps still remain.

Enough experience and knowledge have been gained already by both municipalities and SMEs. It can be shared. We already seem to have entered the second wave of municipal innovation adoption. The pioneers have adopted and demonstrated the benefits. The many case studies that are already available, coupled with the growing success of collaborative engagement and communications events such as Smart City Expo World Congress in Barcelona, the Eilat Eilot conference and other events open the door for more cities. Yet participating in a conference or reading a case study are not enough. If there is the political will and understanding that every authority has great human, social, economic and environmental potential, and if there is a willingness to engage with other municipalities, learn and embrace actual initiatives, the way is paved for innovative and environmental solutions that will yield great benefit.

4. Conclusion

The Urban Challenges Identification Survey has found a profound awareness and interest in the implementation of innovative solutions and of environmentally sustainable initiatives in both large and small cities across the Mediterranean. Yet it also found existing challenges and barriers.

These challenges have an horizontal effect across the board, resulting in a gap between city needs and the actual implementation of innovation and sustainable solutions. This gap is evident in most environmental and urban concern areas, with the sole exception of sustainable energy in which a breakthrough effort is evident.

Mayor and CEO leadership, political will and setting of priorities, combined with up-to-date knowledge, skills and a sense of ability to execute, which can be increased by sharing the experience and experience of other cities can all pave the way to embrace sustainable innovation and reap the benefits. We envision that cities can work in collaboration as clusters of cities, while SMEs can work together in collaboration to provide a toolbox of solutions for a comprehensive solution to the needs that arise from the cities. A synergy between larger and more experienced innovative cities and smaller cities with less experience, can help to realize the great potential that exists. Broadening this collaboration with clusters of SMEs may create a powerful alliance

to change. We suggest to put these conclusions to the test by conducting action research to explore alternative channels:

1. Clusters of cities to share experience and to explore together common issues to resolve
2. Regional clusters where larger cities can lead the way and share their experience with smaller cities. The large cities will also benefit because innovative, sustainable, climate-neutral development of small surrounding cities will have a positive effect on the entire region
3. Clusters of SMEs that collaborate to create synergic offerings to provide comprehensive solutions in specific areas such as mobility, air quality and waste management. Collaborating rather than competing.

The potential of these channels to address challenges and overcome barriers, will be explored in the next phases of the SME4SMARTCITIES project, leading to actual pilots and proof or concept projects.

5. Annex 1 Survey Questionnaires

The Cities Challenges Survey was conducted by both direct semi-structured inverviews and an online survey. The same questionnaire was deployed in both channels.

SME4SMARTCITIES: Municipal Smart Innovation and Procurement Survey:
English
Spanish
Italian
Hebrew