



# DIGITAL CITIES CHALLENGE

## Assessment report for the city of Algeciras

### ***Bridge to Europe***

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# Digital Cities Challenge

Assessment report for the city of Algeciras

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# 1. Introduction to the Digital Cities Challenge

According to the recent data, 72% of the EU's population lives in cities, towns and suburbs, making them the engines of the continent's economy. Cities generate 85% of Europe's GDP, they also face multiple, interconnected challenges, including energy and climate change, employment, migration, social inequality, and water, air and soil pollution.

However, through advanced digital technologies, Europe has the opportunity to re-invent the way we manage our cities' development and respond to the big societal challenges, such as efficient health management, cleaner environment, green mobility, and offering great-value jobs. Due to their high density, cities are put in a very good position to create innovative ecosystems made up of a wide array of different stakeholders from government, industry, finance, academia, communitarian organisations, social partners, etc. Cities have the capacity to make policies become reality.

In this context arises the **Digital Cities Challenge**, an initiative of the European Commission with the main purpose to support the cities in their path to digital transformation. DCC offers policy advice and support to 15 cities in Europe, namely **Alcoy**, **Algeciras** and **Granada** in Spain, **Arad** and **Iasi** in Romania, **L'Aquila** in Italy, **Kavala**, **Patras** and **Thessaloniki** in Greece, **Sofia** in Bulgaria, **Ventspils** in Latvia, **Grand-Orly Seine Bièvre** in France, **Pori** in Finland, **Rijeka** in Croatia, and **Guimarães** in Portugal. The support to be offered will speed up the digital transformation and the industrial modernisation of cities in order for them to take full advantage of the 4th industrial revolution.



This initiative draws inspiration on the recommendations set out in the "Blueprint for cities as launch pads for digital transformation". In addition, it will reinforce the networking among model

cities, facilitate their participation in on-going European initiatives in similar policy fields, strengthen stakeholder collaboration, cross-regional partnerships and stimulate investments.

The selected Digital Cities receive support in the form of field advisory services to be provided by a group of high level experts and peer reviewers, and offer the possibility for city representatives to participate in a series of capacity building and networking seminars. These activities take place in four Academy seminars during which cities share practices, take advantage of peer to peer learning and work together and in thematic groups on the steps of their transformation trajectory.

More specifically, **Digital Cities Challenge in Algeciras** will pave the way towards digital transformation and modernisation on the city's industrial tissue (commercial local fabric and open government process). The expected results of this initiative on the city can be summarised in two points:

1. **Advance in Algeciras' digital transformation process** by means of:
  - Diagnosis of the current situation.
  - Involve and agree a common vision with all relevant stakeholders.
  - A global digital strategy for the city (linked to its Smart City Strategy).
  - Action plan to implement the strategy: Activities; Timing; Financial plan.
2. **Reinforce the EDUSI** providing a digital and an international perspective to it

This document has been developed in the framework of the field advisory services being delivered in the city of Algeciras. It represents the main output of the first step of the digital transformation strategy: setting the digital vision and ambition for digital transformation. Starting points were 1) first European project ever; 2) a strongly committed local team; 3) a good chance to align and strengthen its transversal strategies providing an international projection to them; 4) a variety of stakeholders who never sat together.

The assessment report has been developed by the Digital City team on the basis of:

- The results of the Self-Assessment Tool and collection of Key Performance Indicators at the city level which took place between 23th March and 25th May 2018). A total of 18 valid replies were collected through the SAT.
- A literature review of key documents provided by the local leadership team (EDUSI strategy Master Plan, Urban Agenda 2030, Smart City Strategy document, Traffic improvement master plan and guidelines).

- An assessment visit which took place 22nd-23rd March 2018.
- A vision and ambition workshop which took place 27th April 2018.

This document represents the key input to the work to be performed during the forthcoming phases of the digital transformation trajectory (i.e. definition of the city strategy and roadmap).

## 2. Key sectors of the local economy and DCC focus

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Algeciras is predominantly a **port, industry** and **services** city. It has the most important port in Spain, (considered the South Gate of Europe for commercial traffic of Africa and the Americas) and indeed the Mediterranean as the fifth largest port in Europe in terms of goods and container traffic. Additionally, Algeciras is a gateway to North Morocco, estimating of five million people passing through Algeciras every year for summer holidays of European emigrants' population. The Port has an important economic impact on the city, providing around 28,000 jobs (direct and indirect), and almost 2,000 million euros in Gross Value Added.

**The transport and goods storage sectors**, which are closely linked to the port and to the large industries in the Campo de Gibraltar, account for a further 17%. **The construction** (civil works and engineering), **commerce** and **industrial sectors (petro-chemical, metallurgy and energy & gas generation, distribution and commercialisation)** together make up 40% of the companies in Algeciras. The city's strong **industrial sector** includes 13 large national and multinational companies including Cepsa (petro-chemical), Acerinox (metallurgy), CLH (petro-chemical), Endesa (energy) and Abengoa (civil construction) which together have a substantial economic impact, with a GVA of 2,380 million € and 17,850 jobs.

Lastly, with regard to the **retail and services sector**, it has a very low degree of specialisation (46.7%) and relatively few shops have an online presence or e-commerce platforms, far below the figure of 75% required to be considered an attractive town centre shopping area in Digital City terms. This indicates a lack of competitiveness in local businesses and low investment in innovation, which results in low quality, relatively unspecialised jobs. The city does not fully exploit its economic potential as an attractive place to visit or live either. For instance, **the tourism-hospitality sector could much better benefit from the application of ICT based solutions**, all of which hinders talent retention and employment opportunities to its most qualified people (most of whom are young). The low level of the local economy's competitiveness was compounded by the economic crisis, with dramatic effects on unemployment, which has increased more sharply than in other cities across the province. Between 2007 and 2014, unemployment in Algeciras rose by 99.04% the second highest increase in the province of Cádiz. Four groups were most affected by unemployment: women,

young people, immigrants and the long-term unemployed. One of the measures taken by the Algeciras City Council to tackle this situation was the Smart City Master Plan. It seeks to promote innovation and the use of new technologies (notably e-administration and ICT applied to public services) as key elements to produce a new economic model that stimulates jobs creation, business activity, better quality of life as well as a smart management of the city.

On top of this, with a broader approach now comes the DCC to Algeciras focusing on the digital transformation of the existing companies and on the creation of new ones so they all grow and generate qualified employment. In particular, bearing in mind the aforementioned economic figures, past experiences, global projections and most importantly the opinion of the consulted stakeholders, the DCC focus will be put on the following sectors:

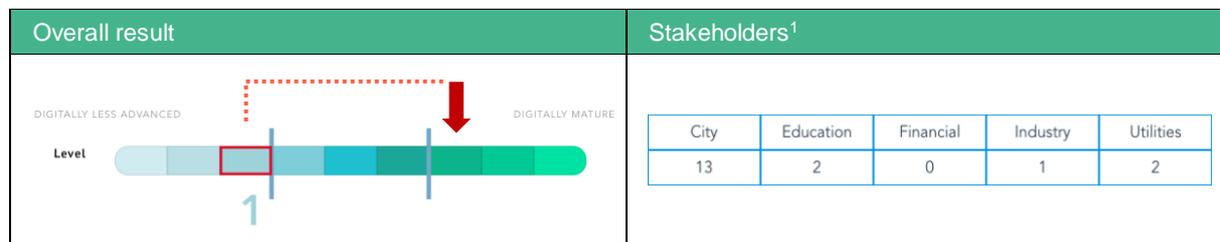
- Transport and logistics.
- Services to the petro-chemical, metallurgy and energy industries.
- Retail & hospitality.
- Innovative services for the welfare and quality of life within the city.

### 3. Digital maturity level of the city: outcomes of the Self-Assessment Tool and Key Performance Indicators

#### 3.1. Outcomes of the Self Assessment Tool (SAT)

By using the SAT it was possible to identify the starting points for discussion on how to further develop, reshape and improve the digital transformation strategies of the city of Algeciras. The overall results of the SAT showed that Algeciras stands at the level indicated below:

Figure 1 Self-Assessment Tool overall result



As the graph indicates, **Algeciras is a Digitally Less Advanced city**. More concretely, it is positioned in the upper part of the low level, which indicates that there is a lot of room for improvement under the context of digital transformation. The city wants to have a clear digital strategy and it has begun taking the necessary steps towards digital transformation. In fact, the city’s objective would be **to move on 4 levels within the next 3-5 years and position itself at the lower level of a digital mature European city**.

The SAT had eight dimensions analysed: Open data, Community, Governance and Leadership, Support services, Finance, Digital skillset, Infrastructure and Digital competencies of companies. The city’s average outcome showed significant variation featuring high and low performing fields depending on the SAT filling user’s point of view (see picture below).

<sup>1</sup> There was a procedure misunderstanding and most of the filling users indicated they'd come from the "City". Approximately 1/3 of the responses came from companies (industry & utilities), 1/3 from research & academia and 1/3 from the municipality.

Figure 2 City stakeholder average assessment



From the discussions held with the stakeholders, a complementary assessment would indicate that in global terms there's a better perception of digital maturity level at public and research related bodies than at private organisations (taken individually or via intermediaries). This probably explains why “digital Skillset” ranked higher than most of the other dimensions while at the same time there's a common consideration that says Algeciras lacks digital talent and personal digital capabilities.

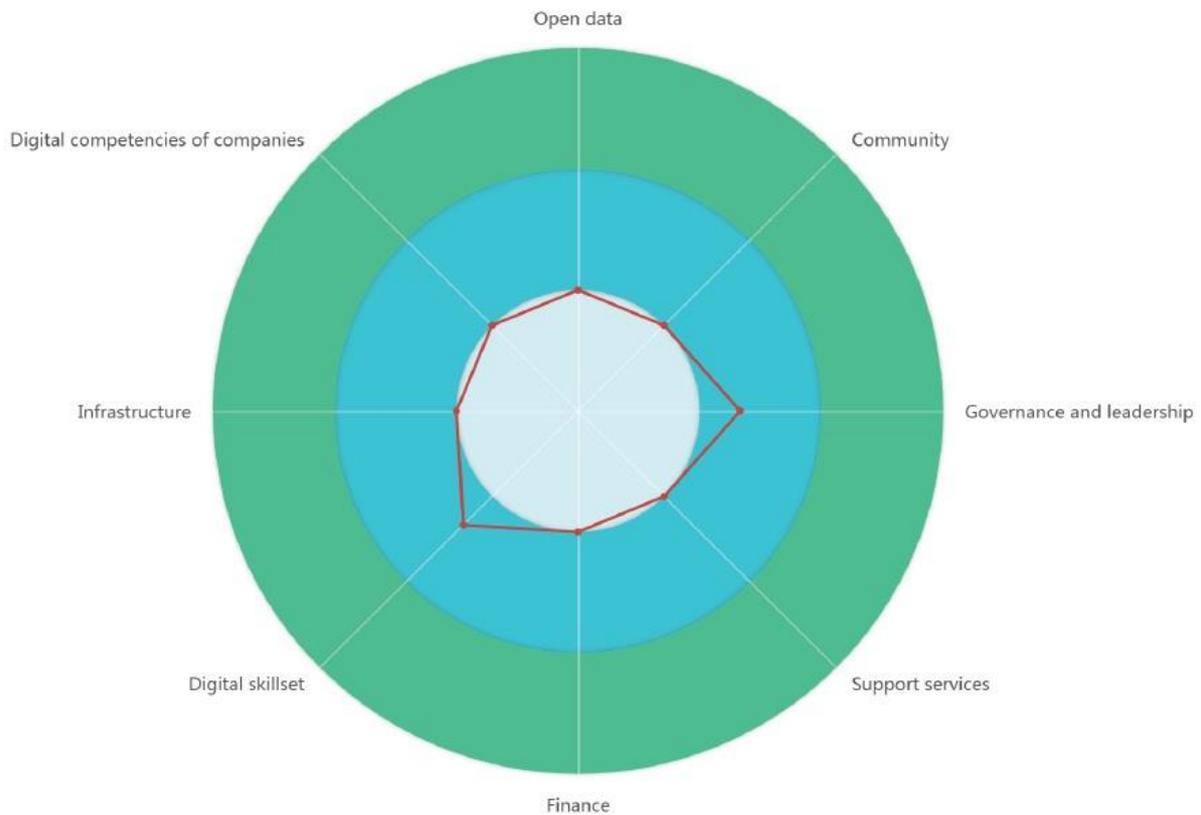
In any case, what's generally accepted (confirmed in many of the conversations held with the stakeholders) is that the Governance & Leadership dimension is a strong one. Mainly due to a clear vision and commitment of the municipality team led by the Mayor's office which influence can also be seen at sub-dimension level especially in Coordination and Implementation/Monitoring.

Yet, challenges as well as lot of room for improvement remain in most of the other themes like **Finance, Support services, Infrastructures and Open Data**. All of them need to be tackled in the next DCC steps since they are all interrelated and their low maturity level has been corroborated. All these results obtained in the Self-Assessment are summarised visually in Figure 3 below.

If we have a closer look into the **Community dimension**, despite its low level on average showed at the above figure, it is worth mentioning that during the field visits Digital stakeholders admitted having access to fairly good networking opportunities. However, the maturity level of mentoring and ecosystem collaboration is very low. Problem here is that those opportunities are not accompanied with a real collaboration mind-set. The strategy derived from this assessment report has to implicitly contain actions to promote cooperation and a change in the way companies and citizens approach joint activities with other stakeholders.

**In summary,** Algeciras displays a mixed performance with medium-level scores in the few dimensions where the public sector is somehow the driving force (or could have greater influence) and much lower levels on those dimensions where the private sector and its interrelations are key.

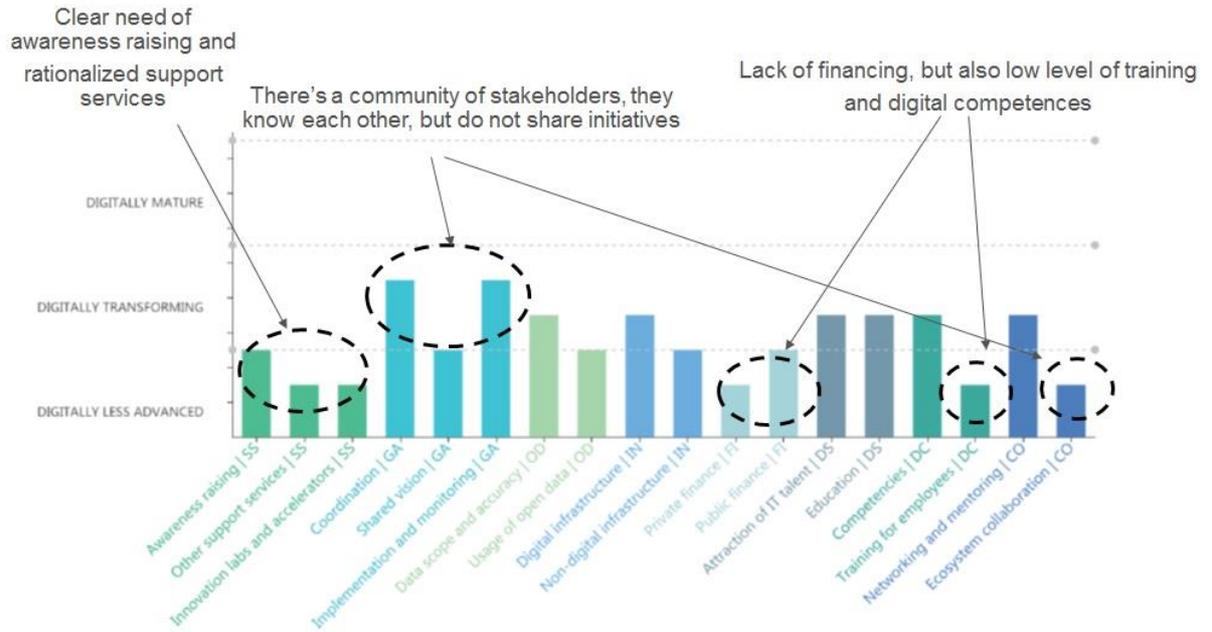
*Figure 3 City stakeholder average assessment by dimension*



Having a look into the sub-dimension level the main conclusions are the following (also included in the Figure 4 below):

- There's a clear need of awareness raising and rationalised support services.
- There's a community of stakeholders, they know each other but they do not share initiatives or opportunities.
- There's a lack of financing, but also low level of training and digital competences.

Figure 4 City stakeholder average assessment by sub-dimension



IN = Infrastructure (2)  
OD = Open data (2)

DS = Digital skillset (2)  
DC = Digital competencies of companies  
SS = Support services (3)

FI = Finance (2)

CO = Community (2)  
GA = Governance and leadership (3)

## 3.2. Key Performance Indicators

The digital maturity of the city can also be evaluated via its Key Performance Indicators (KPIs). Although it would be preferable to have access to more indicators, particularly for the “Support Services” and “Digital Competences of Companies” dimensions, the data that the below table shows coincides to a good extent with the SAT outcomes.

Dimension	Sub-dimension	KPIs	Algeciras
Infrastructure	Digital infrastructure	% of households with broadband internet at home	90,40%
		% of enterprises with broadband internet at home [%]	96,20%
		% of households with internet at home [%]	90,40%
		Average speed of internet [Mbps]	≥ 100Mbps
		Average cost of broadband internet [EUR/Mbps]	not available
		% of people using mobile internet to go online [%]	87,40%
		% of city covered by 4G [%]	79,60%
		Average cost of mobile internet [EUR/Mbps]	not available
		Availability of (intelligent) sensors in the city (e.g. Low Power Wide Area Networks for the connectivity of devices)	N
		Number of unique devices connected to wireless internet freely available at public spaces in last 12 months [#]	N
	Non-digital infrastructure	Availability of integrated mobility platform to travel across transport modes [Y/N]	N
		Availability of real-time transport monitoring system [Y/N]	N
		# of public transportation tickets purchased online [#]	Not available
		Availability of one-stop shop for water, gas, electricity for address changes or new addresses? [Y/N]	N
		Availability of coax or fibre network at main business parks [Y/N]	Y

Dimension	Sub-dimension	KPIs	Algeciras
		% of permits (e.g., housing construction, house extension) applied for online in last 12 months [%]	5,00%
		% of Individuals who used the internet for interaction with public authorities (average for the last three years)	25,50%
Open data	Data scope and accuracy	Availability of open datasets [Y/N]	N
		# of downloads of open datasets in last 12 months [#]	not available
		% of datasets offering real time information [%]	0,00%
	Usage of open data	Number of cases of digital companies using open data to develop a new service or to support their business operation [#]	0
		Number of cases of non-digital companies using open data to develop a new service or to support their business operation [#]	0
Digital skillset education	Digital education	% of people who bought or ordered goods or services over the internet in past 12 months [%]	46,16%
		% of students in digital subjects over the last 5 years [%]	9,63%
		% of ICT graduates employed in the city over the last 5 years	42,75%
		% of non ICT/digital diplomas at university colleges, universities (e.g., medicine, economics, biology, agriculture) including digital courses	0,00%
	Attraction of IT talent	# of employees in digital companies [#]	887
		# of vacancies for digital jobs [#]	59
		% of foreign students in digital subjects [%]	not available
		% of vacancies for digital jobs not filled in 6 months [%]	80
Digital compete	Competencies	% of companies with internet website [%]	58,00%
		% of companies offering online payment option	9,80%

Dimension	Sub-dimension	KPIs	Algeciras
		% of manufacturing companies offering digital services (e.g., company offering remote maintenance)	not available
		# of mobile applications available in the city on smartphone (such as food delivery, peer-to-peer car sharing etc.)	not available
		# of users of mobile applications available in the city on smartphone (such as food delivery, peer-to-peer car sharing etc)	not available
	Training for employees	Share of companies offering training to their employees that are aimed at enhancing their digital skills	25,00%
Community	Ecosystem collaboration	Number of ICT clusters and number of ICT companies joined as cluster member in any cluster organised/formed in the city	35 companies
		# of digital start-ups	17
	Networking and mentoring	Number of events on digital topics and/or for digital companies in the last five years	not available
Finance	Public	Grants / tax incentives provided at city level to support digital start-ups in last 12 months [EUR]	80.000
		# of digital start-ups which received grants / tax incentives at city level in last 12 months [#]	4
		Grants / tax incentives provided at city level to support non-digital companies for digital projects in last 12 months [EUR]	not available
		# of non-digital companies which received grants / tax incentives for digital projects at city level in last 12 months [#]	not available
	Private	Number of digital start-ups receiving a loan in last 12 months [#]	8
		Number of digital start-ups received venture capital in last 12 months	0
Availability of business angels for digital start-ups [Y/N]		N	

Dimension	Sub-dimension	KPIs	Algeciras
<b>Support services</b>	Innovation lab & accelerators	# of innovations labs / accelerators [#]	0
		# of start-ups / companies attached to innovation labs / accelerators [#]	not available
	Awareness raising	Number of participants in awareness raising events organised in the area of digital transformation/Industry 4.0 etc. [#]	not available
	Other support services	# of support services (other than financial) available for supporting digital transformation in the economy	not available
<b>Governance-leadership</b>	Shared vision	Availability of digital strategy [Y/N]	N
	Coordination	Availability of clear executive responsible for digital development plan [Y/N]	Y
		# of man hours of executive responsible on weekly basis dedicated to coordination of digital development plan [hours]	not available
	Implementation and monitoring	Existence of a monitoring framework for the implementation of the city digital strategy [Y/N]	Not yet

## 4. The local digital ecosystem: leadership and governance

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Algeciras wants to set up a well-defined digital ecosystem ("Digital City Algeciras") organised around four key stakeholder types: Educational Institutions, Public Authorities, Business Associations and Third Sector. In each of the four groups there are various institutions that act as leaders and as the driving force



for the rest of the innovation ecosystem. These include the **Andalusian Federation of Towns and Provincial Councils (FAMP)**, **the City Council** and its related departments (European projects, Economy and Treasury, IT, Trade and Industry, Mobility, Traffic and pedestrian safety, employment promotion and Environment) as well as other important stakeholders in the city such as **Algeciras Port Authority**, the **University of Cádiz**, the **Association of Large Industries** in the Campo de Gibraltar and its **Chamber of Commerce**. Two more main stakeholders identified and involved in the local digital ecosystem are the following:

- Algeciras **technological Campus Foundation** (the training and research area).
- **Commonwealth of Municipalities** of the Campo de Gibraltar (greater Algeciras bay area).

The Technological Campus of Algeciras wants to strengthen ties with other agents in the region, but also at a national and international level. They are particularly interested in taking part in European projects via partnering through consortia that could further enhance the city's welfare. The Chamber of Commerce works on the internationalisation of enterprises, as well as, in training, entrepreneurship, innovation and in the creation of new companies. The innovation programs -ICT- they offer include INNOCAMARA Program, TIC CAMARA program (cloud computing) and TOURISM Program (ICT for companies in the tourism sector). The Chamber of Commerce is interested in Business incubators, Entrepreneurship promotion projects and in the incorporation of new technologies into companies' products and services.

As already said, the Port of Algeciras is one of the city's main actors and assets, It has developed several innovation projects such as the Port Community System (TELEPORT), a system for the coordination of the port's daily function services.

Managed by the Campo de Gibraltar Commonwealth of Municipalities, Europa Direct Point is the action responsible for providing any information related to EU policies and matters relevant for citizens. Though not specialised, if required this entity could also provide information to the business sector (technological or non-technological).

Within the City council, the IT Department works on the development and implementation of the first steps towards a full **e-Government (e-administration)**, including processes such as payment of fees, profile of the contracting party, registration of documents and some others. It also works in the communication area, the citizen service office and the municipality's **transparency portal**. In addition, the mobility, traffic and pedestrian safety; department works on Algeciras mobility plan, smart city plan and the Urban Agenda 2030. The Delegation for promotion and employment, on the other hand, is responsible for the motivation, guidance and advice to all the enterprising people, and also works on the orientation to job search and training of unemployed. In this department, several needs have been identified such as; the great demand for services and tools that favour **digital inclusion** for all companies in the area, the usefulness of the ICT business software, the necessity to improve the tools for job search, applications for user management, tools for training (webinars), or the training and career guidance (and now also business advice, since many entities are doing the same). Therefore, it is of great importance that the actors mentioned above, establish common goals and align their efforts for a successful digital ecosystem. In this sense, the existing related strategies (aforementioned) serve as main baseline for such alignment. These are:

- Smart city director plan.
- Mobility plan & road safety.
- Urban agenda 2030.

## 5. The use of digital solutions by local companies

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In the city of Algeciras, only big corporates have already started a digital transformation process. We refer mainly to those operating in the **petro-chemical, metallurgy, logistics and energy** sectors. However, they are not bringing SMEs along. Thus, there is a big gap between large companies and SMEs in the city area. Despite this fact, there are few good examples of well performing SMEs that could show the way to others. For instance, the service sector, hospitality in most cases, is already performing pretty well (even small companies).

Some companies seem not used nor prepared for changes of paradigms, their daily work usually prevents them from innovation. So, there is a **strong need of a sustained and intensive awareness raising** in companies with regards to digital solutions. Capacity building and training is pivotal, for university students, but also for employees. There also seems to be a **low level of awareness and knowledge about cybersecurity** and its implications (precautions, problems, existing solutions, etc.). Great market and funding opportunities are arising in this field across the H2020 and the Horizon Europe program since within the next decade, cybersecurity and privacy technologies will become complementary enablers of the EU digital economy, ensuring a trusted networked ICT environment for governments, businesses and individual citizens. Therefore, new opportunities for participating in R&D and innovation projects lay ahead all companies willing either to test or to develop such digital technologies.

When interviewing the chamber of commerce and business associations, the lack of experience and resources to launch digital projects within companies, seemed to be one of the greatest concerns. Also, low awareness level about supporting funds and programs characterised local companies. Despite the fact there are several instruments to finance projects offered by the National Ministry of Industry, Energy and Tourism as well as from the local, provincial and regional levels (Chamber of Commerce, IDEA Agency, etc.), often we found SMEs in all sectors that do not know if there's any kind of incentives or financial support available from the municipality and from the private financial institutions to promote digital initiatives within companies.

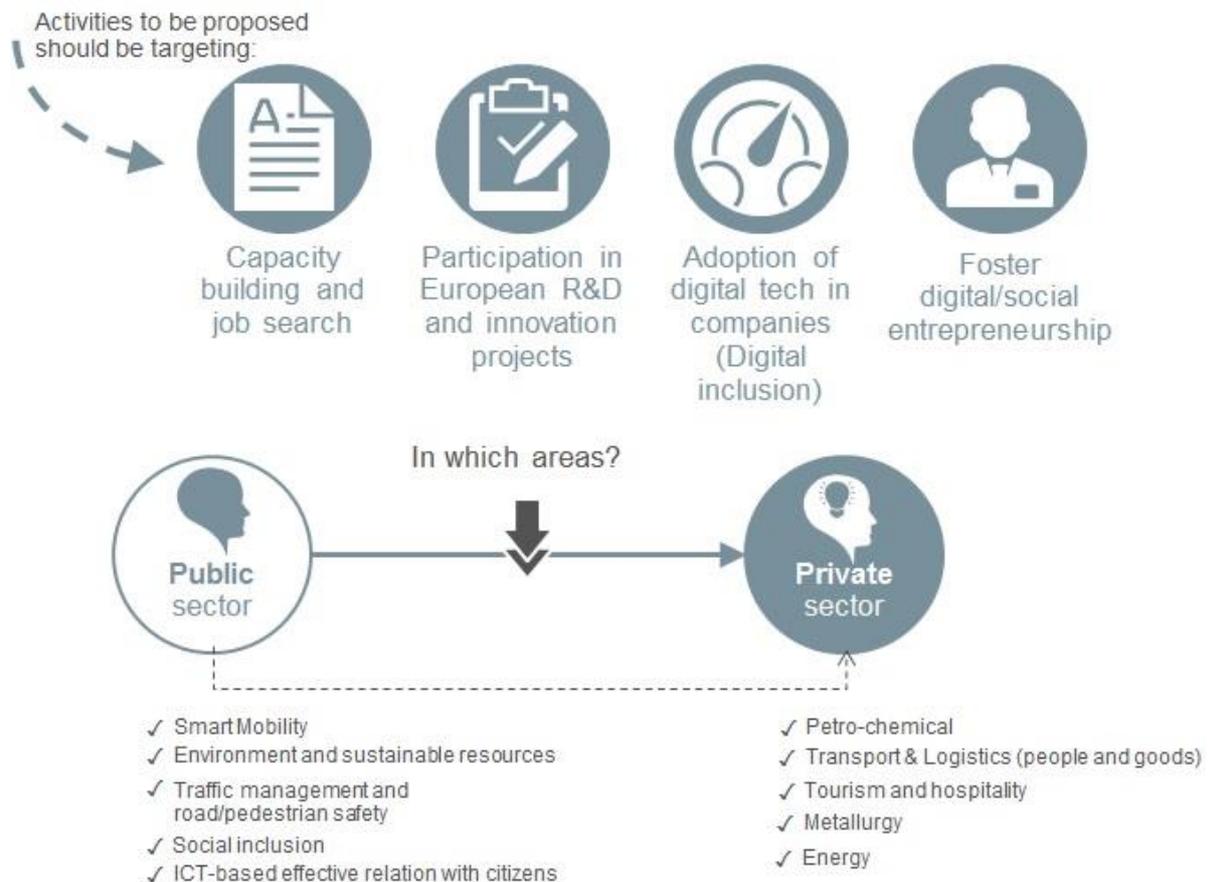
Stakeholders that are closer to academy or have R&D as main activity field (more accustomed to cooperation) mentioned during our conversations, that one of the difficulties that they see, not only in the presentation of projects of a digital nature, but in projects of any kind, is that companies are not very accustomed to present projects (it is not quite their main goal), since they are focused on their day to day business activities, or because they do not know the existing grants of the different organisations.

## 6. Community engaged in digital transformation

Algeciras lacks a common strategy and vision to digitally transform. The collaboration culture is not particularly strong and the city is very much dependent on the port. Through the leadership enabled by the municipality, there needs to be an increase of knowledge transfer and collaboration culture, covering all the relevant city layers. Social issues have a strong influence in Algeciras as well so these must be kept under consideration and be exploited in a positive way.

During the field assessment work and the meetings held with the local stakeholders, we were able to identify a **main necessity**: **Creation, retention and attraction of digital talent.**

Figure 5 Main necessities identified



In light of this, great opportunities to launch crossline projects with real impact on citizens and businesses not considered in other strategies have been identified- These are the following:

1. Participation of various stakeholders in a joint project to deal with digital training and channel grants for companies, especially for SMEs, for projects of this nature, digital transformation.
2. Development of a recruitment and retention plan for talent at all levels: starting with attracting the students with the best grades in high school to the UCA (Universidad de Cádiz), plan to incorporate the best students in the master's degree, plan to incorporate researchers into groups of research and companies, etc.
3. Design and implementation of a digital talent generation/attraction program aligning the interests of all University, the local authorities and the private companies as well as enabling financing instruments to stimulate contracts of digital skilled employees.
4. Development of a Joint Innovation Unit between the University and the Companies that has the following objectives: 1) Advanced data analysis. Modelling and Simulation. 2) Development of decision support tools 3) Talent capture.
5. Launch of a startup acceleration program specifically designed for the technical and business requirements of the few big industry players and the Port of Algeciras.
6. Digital divide reduction & capability building program (in the strategic sectors).
7. Setup and run of a common Open Innovation Unit between research stakeholders and companies focused on the city's relevant economy sectors aiming at:
  - Advanced data modelling, analysis and simulation
  - Information management systems for decision-making
  - Training and attraction of talent
8. Setup a PPP devoted to Micro-finance, Seed and Venture Capital investing instruments for digital (or digitalisation) of SMEs, self-employees and startups with:
  - Business of strategic relevance for the city, or
9. A clear social component in their activity (social inclusion, young entrepreneurs, women integration, social innovation).
10. Enable the participation of diverse stakeholders, especially SMEs, in development processes of joint electronic commerce platforms that promote the digital transformation of companies within the city.

11. Launch a “market of ideas” project competition, in which using digital technologies participants propose innovative solutions for waste management (circular economy) particularly during the summer period where millions of people pass by the city.

## 7. The state of local digital and physical infrastructure

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There is a huge willingness to improve the local digital infrastructure from both citizens and SMEs, however they are just at the starting point currently and there's still a long way to go to be in a position to fully exploit digital capabilities. We've detected deficiencies at the level of network infrastructure, such as **broadband**, **4G coverage** or **access to free Wi-Fi**. An additional hurdle is that there are no references or background experience for sizing reliable networks and infrastructures in the city of Algieras. We're perfectly aware that this could be seen as an opportunity for a totally customised digital implementation with a network architecture fully adapted to the city's expectations and strategy. Worth to mention here is also that although existing businesses seem unable to digitally catch-up and increase competitiveness, the port and other big corporations could traction such infrastructure implementation in the short-medium term. In fact, it is only within the boundaries of these specific industrial areas where advanced digital infrastructure able to support complex cloud platforms and applications can be found.

To overcome the lack of creation of new digital based companies and in full alignment with a customised digital strategy, the local authority's resources should be used at least in two main directions. First, it is necessary to extend the electronic relations with citizens and the services offered where possible with the use of digital certificates. Secondly, the implementation of an advanced metropolitan communication network infrastructure able to integrate heterogeneous data sources: weather variables, emergency and alerts, traffic and transportation, etc. is considered to be an interesting line to deploy. Furthermore, in order to boost new digital infrastructures, networking/interaction spaces can be built for sharing and showcasing to citizens and companies' useful digital applications (pilots). Deploying in the city of on-site demonstrators of adoptable and useful technologies. Those places around the city will find examples as proof of the benefits (social and economic) of digital transformation.

Finally, it is of great interest to mention the gaps in coverage/connectivity as far as the current network infrastructure is concerned between Algieras urban and industrial areas. In this sense, there is a need to maximise fixed bandwidth network, 4G communications and free public Wi-Fi networks so they become a commodity in the city (urban area).

## 8. Digital solutions enabling the modernisation of business environment

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The city of Algeciras is part of the "Spanish Network of Smart Cities" and the "Networks of Agents for the Smart Development of Andalusia (NASDA)". The focus of NASDA is on training of managers and collaboration between the Andalusian cities and ICT companies. The city is also a central pillar to the "Regional Government's Andalusia Smart2020 Strategy, whose ambition is to stimulate the creation of jobs and economic growth through the ICT sector but also to improve existing public utilities. Within this framework, the municipality of Algeciras is building a Smart City Strategy by developing new digital services for citizens through the Smart City platform in order to facilitate relations between locals and the City Council. (i.e. the city is in the process of developing an electronic card to connect both parties). Moreover, the city is investing in 'Sustainable & Smart Mobility' (i.e. Smart Port with real time info & efficient business processes, smart parking platform, smart traffic centre and smart pedestrian crossings). They are also actively combating pollution and putting effort to reduce energy consumption in public areas (i.e. smart sensors). Additionally, Algeciras is working on the improvement of the digital skills of the under-35 unemployed to give them access to employment. The city also launched the "Algeciras Job Growth Programme" designed to accredit professional skills to non-formal training paths. Bearing all of this in mind, our conclusion about the key enabling digital technologies that need to be promoted:

- **Cybersecurity** (There is little awareness and knowledge about cybersecurity and its implications (problems, existing solutions).
- **Big data.**
- **Data mining** and analysis.
- Digitalisation of business processes (**digital economy**).
- **Advertising / marketing**, presence on the Internet and Social Networks to attract customers, use of Apps, IT management, Cloud computing (SaaS, PaaS).

## 9. Data-driven innovation

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The city of Algeciras, its citizens and its companies are in a very good position to access a **huge amount of data related to transportation and logistics**. Equally, there are also high opportunities to use **environmental data** which is being collected in several points across the city. Such data with relevant and useful environmental variables could help if properly addressed to boost local ICT-based companies as well as to better position the city regarding the usage of Open Data. Indeed, there are great opportunities for improving access to data and to make it a real input for innovation.

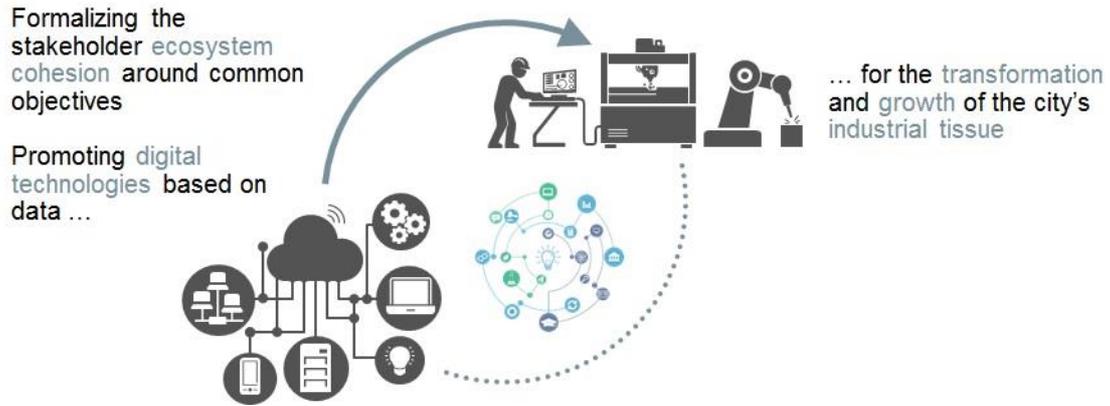
These could be the following:

- Increasing open data sets openly available: the most relevant types of data to local businesses are trade, market competition, global economy behaviour, transport, energy consumption and environment related. The public sector on the other hand could additionally foster the creation of new businesses whilst improving its relationship with locals, immigrants and visitors by providing access and exploiting open datasets related with “social issues” as well as employment and working conditions of the local industrial sectors.
- Exploiting interoperability and integration.
- Increasing awareness by adapting and implementing success stories of companies exploiting data: There aren't currently any meaningful examples apart from some initiatives implemented by the Port Authority. These enable seamless collaboration along the whole cargo operation process between different port stakeholders through standardised nomenclature and a simplified data model which creates holistic operational awareness along container vessel call.

However, we found there are two main barriers that are preventing this to happen. On the one hand, the lack of professionals with expertise and capabilities (digital skills) to analyse/exploit the data: Algeciras needs more data scientists and analysers. On the other hand, most of this data is not accessible due to the fact it's a third party that holds the ownership of such data: Algeciras needs to foster cooperation and open data access.

These are the reasons why a first working proposal for the next months could be the creation of a **Digital Innovation Hub** - It needs to be further discussed, but it could be depicted as follows:

*Figure 6 Digital Innovation Hub*



Hence, the local public sector is urged to facilitate the use of digital solutions to further promote the creation of a friendlier business environment based on the use of data.

## 10. Skills and entrepreneurial culture

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Motivation behind the start of a business influences the propensity of business leaders to adopt digital technologies. In the case of Algeciras, the **performance in entrepreneurial culture shows significant room for improvement**. Data collected indicated that the majority of the SAT users felt that there is a lack of resources to launch new projects. On the one hand, the stakeholders that participated in the SAT say there's a common ignorance about existing granting sources to develop digital projects. On the other hand, there also seems to be a lack of citizens/employees' awareness and training on digital skills.

As already mentioned in chapter 7, there is a need for skills and talents, at a general level which include; knowledge and mastery of digital technologies, strategic vision and digital leadership, and applicability to business processes (operational and relationship with the client). Very much more specialised profiles are required as well, especially in private companies, for example:

- Data Scientist – This is a profile whose work focuses on extracting knowledge from large volumes of data extracted from different sources and multiple formats. This way they respond to problems that arise and look for solutions.
- Also, Data Analyst – profile that is responsible for interpreting data and analysing results using statistical techniques. They also develop and implement data analysis, data collection systems and other strategies that optimise statistical efficiency and quality. Acquiring data from primary or secondary data sources and maintain databases is also their speciality.

The university and technological campuses of Algeciras are willing to and have the capacity to cooperate. This is important, since there is a poor traction rate in knowledge transfer between academia and businesses. Sound service sectors are also demanding digitally skilled professionals, since there's a clear brain drain to other regions and cities, leaving insufficient number of specialised workers able to cover eventual increase of business demand in the city of Algeciras. Hence, **more adaptation of university programs to digital skills and increasing digital literacy of citizenship** would combat the irretrievable digitally lagging behind situation, as well as, decrease the city's unemployment rate.

# 11. Digital transformation SWOT analysis

	Strengths	Weaknesses
 <b>Infrastructure</b>	<ul style="list-style-type: none"> <li>&gt; Huge willingness to improve from both citizens and SMEs</li> <li>&gt; Resources of the local government</li> </ul>	<ul style="list-style-type: none"> <li>&gt; At the starting point now, still long way to go</li> <li>&gt; No reference or background experience for sizing reliable networks and infrastructure</li> </ul>
 <b>Access to data</b>	<ul style="list-style-type: none"> <li>&gt; Usefulness of environmental data</li> <li>&gt; Huge amount of data related to transportation and logistics</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Data not accessible due to third parties ownership</li> <li>&gt; Data scientists and analyzers deficit</li> <li>&gt; Insufficient awareness to users</li> <li>&gt; Lack of cybersecurity knowledge</li> </ul>
 <b>Digital skillset</b>	<ul style="list-style-type: none"> <li>&gt; Strong will and capacity of university and technological campus to cooperate</li> <li>&gt; Sound service sector demanding digitally skilled professionals</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Poor traction rate in knowledge transfer</li> <li>&gt; Awareness and training of citizens</li> <li>&gt; Insufficient number of specialized workers able to cover eventual increase of business demand</li> </ul>
 <b>Companies' digital competencies</b>	<ul style="list-style-type: none"> <li>&gt; There are some big corporates that could involve SMEs into digital through providers' training programs</li> <li>&gt; Strong petrochemical and logistics sector</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Big gap between large companies and SMEs</li> <li>&gt; Not used nor prepared for changes of paradigm</li> <li>&gt; Daily work usually prevents innovation</li> </ul>
 <b>Community</b>	<ul style="list-style-type: none"> <li>&gt; Leadership enabled by the city</li> <li>&gt; Covers most of the important layers</li> <li>&gt; Strong link with social issues</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Lack of common strategy and vision</li> <li>&gt; Lack of collaboration culture</li> <li>&gt; Very much dependent on the Port of Algeciras</li> </ul>
 <b>Finance</b>	<ul style="list-style-type: none"> <li>&gt; Fair access to public mechanisms at local, regional and national levels</li> <li>&gt; Existing projects like EDUSI (from ERDF)</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Just few collaborations with financial institutions</li> <li>&gt; Weak private resources</li> <li>&gt; Unawareness of opportunities</li> </ul>
 <b>Support services</b>	<ul style="list-style-type: none"> <li>&gt; Local and accessible support services</li> <li>&gt; Complementary resources</li> <li>&gt; Strong willingness to cooperate</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Not single entry point</li> <li>&gt; Unawareness of services that are available</li> <li>&gt; Only first level support, low specialization</li> </ul>
 <b>Governance &amp; leadership</b>	<ul style="list-style-type: none"> <li>&gt; Clear compromise from local authorities</li> <li>&gt; Funds available to launch common projects</li> <li>&gt; Skilled people to lead the process</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Apart from the city hall, there's no clear leadership</li> <li>&gt; Port of Algeciras does not lead interaction with the city</li> <li>&gt; Dispersed responsibility and incoordination</li> </ul>

	Opportunities	Threats
 <b>Infrastructure</b>	<ul style="list-style-type: none"> <li>&gt; Broadband, free Wifi and 5G networks</li> <li>&gt; Deployment fully aligned with digital strategy</li> <li>&gt; The port and other big organizations could traction its implementation</li> </ul>	<ul style="list-style-type: none"> <li>&gt; No creation of new digital based-companies</li> <li>&gt; Existing business unable to “digital catchup” and increase competitiveness</li> </ul>
 <b>Access to data</b>	<ul style="list-style-type: none"> <li>&gt; Increasing open data</li> <li>&gt; Exploiting interoperability and integration</li> <li>&gt; Increasing awareness</li> <li>&gt; Adapting and implementing success stories</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Lagging behind companies</li> <li>&gt; Impossibility to solve reluctance to data sharing</li> <li>&gt; Lose data for exploitation</li> <li>&gt; Decreasing competitiveness</li> </ul>
 <b>Digital skillset</b>	<ul style="list-style-type: none"> <li>&gt; More adaptation of university programs to digital</li> <li>&gt; Increasing digital literacy of citizenship</li> <li>&gt; Improving collaboration with market (businesses)</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Increase of unemployment rate</li> <li>&gt; Brain drain to other regions and cities</li> <li>&gt; Irretrievable digitally lagging behind situation</li> </ul>
 <b>Companies' digital competencies</b>	<ul style="list-style-type: none"> <li>&gt; Participation in R&amp;D projects</li> <li>&gt; Innovation management gets in the strategy</li> <li>&gt; Enhancing business-oriented capacities (better digital programs implementation)</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Wider gap with competitors</li> <li>&gt; Decrease of local competitiveness</li> <li>&gt; Unbalanced transformation</li> </ul>
 <b>Community</b>	<ul style="list-style-type: none"> <li>&gt; Launch crossline projects with real impact in citizens and businesses</li> <li>&gt; Increasing knowledge transfer and collaboration culture</li> </ul>	<ul style="list-style-type: none"> <li>&gt; More isolation of the Port activities so city evolving in 2 separated different parts and speeds</li> <li>&gt; Slow decision-making process</li> <li>&gt; Lose cooperation momentum gained so far</li> </ul>
 <b>Finance</b>	<ul style="list-style-type: none"> <li>&gt; Supporting the creation of start-ups and more social projects</li> <li>&gt; Facilitating the development but also the exploitation of R&amp;D and innovation projects</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Change in investment priorities</li> <li>&gt; Slowing down the required transformation rhythm</li> <li>&gt; Unbalanced transformation</li> </ul>
 <b>Support services</b>	<ul style="list-style-type: none"> <li>&gt; Sector and skills-driven specialized options</li> <li>&gt; Creation of new economy</li> <li>&gt; Orientation of resources for digital technologies</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Unable to really boost digital transformation</li> <li>&gt; Slow pace in start up creation or business development and grow</li> </ul>
 <b>Governance &amp; leadership</b>	<ul style="list-style-type: none"> <li>&gt; Involve citizens and companies in the city's digital transformation and modernization</li> <li>&gt; Much more optimization of resources</li> </ul>	<ul style="list-style-type: none"> <li>&gt; More dispersion and disillusionment</li> <li>&gt; Complete separation from the Port's activities</li> <li>&gt; Bigger dispersion and incoordination</li> </ul>

# Appendix I: Table of abbreviations and definitions

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## **Digital Cities Challenge (DCC)**

This is the name of the initiative, launched in November 2017 and scheduled to run until August 2019. It is supported by the European Commission.

## **Digital Cities (DC)**

Digital Cities are the 15 European cities that have been selected to receive support throughout the duration of the initiative.

## **Digital City Teams (DCT)**

Each participating Digital City has a Digital City Team which will be in charge of managing and coordinating the involvement of Digital Cities in the Challenge. Digital City teams will include a) the core team which consists of one Lead Expert, one Local Expert, one Support Consultant as well as Thematic Experts; and the b) the Digital City leadership team which is made up of representatives of the city (i.e. local elected officials, local public servants, and the designated project management team).

## **Digital Transformation Trajectory (DTT)**

The Digital Transformation Trajectory refers to the evolutionary path a city follows while taking part in the initiative, from the preliminary assessment of the digital potential of the City, to the definition of the City's digital transformation strategy and roadmap.

## **Field Advisory Services (FAS)**

Field Advisory Services are services provided by the Digital Cities Challenge to Cities throughout the duration of the initiative. The Field Advisory Services include the organisation of one assessment visit and a number of local workshops, which will gather local stakeholders involved in defining the digital transformation strategy of the City.

## **Key Performance Indicators (KPIs)**

KPIs collect data that can diagnose the current status in terms of digital maturity and measure the progress made by cities during and at the end of the Digital Cities Challenge initiative. KPIs

will facilitate the activities of the policy makers and stakeholders of cities when identifying and addressing the bottlenecks and obstacles of the processes of digital transformation and industrial modernisation. They will also enable the identification of initiatives and actions' key success factors.

### **Self-Assessment Tool (SAT)**

The Self-Assessment Tool is an online-tool developed by the project with a set of questions and corresponding response options. The objective of the SAT is to identify the starting points for discussion on how to (further) develop, reshape and improve the digital transformation strategies of European cities. The SAT covers eight key dimensions: Infrastructure, Open data, Digital skillset, Community, digital competencies of companies, Finance, Support services, Governance and leadership.

### **University of Cádiz (UC)**

University of Cádiz forges dynamic links between the scientific and business communities to put the results of research work to profitable use. It's the patron of the Foundation for a Technological Campus in Algeciras.

### **Port Authority of the Bay of Algeciras (APBA)**

Public Body dependent on the Ministry of Public Works. Responsible for the management of the port of Algeciras.

### **Sustainable and Integrated Urban Development Strategies (EDUSI)**

Cohesion policy 2014-2020 aims to foster integrated strategies which enhance sustainable urban development in order to strengthen the resilience of cities, and to ensure synergies amongst the investments supported by European Structural and Investment (ESI) funds.

### **Key Enabling Technologies (KETs)**

KETs are a group of six technologies: micro and nano-electronics, nanotechnology, industrial biotechnology, advanced materials, photonics, and advanced manufacturing technologies. They have applications in multiple industries and help tackle societal challenges. Countries and regions that fully exploit KETs will be at the forefront of creating advanced and sustainable economies.

## **Appendix II: Bibliography**

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1. Algeciras Smart City Director Plan
2. Algeciras Urban Agenda 2030
3. Algeciras Urban Mobility Plan and Traffic Improvement Plan
4. The sustainable and integrated urban development strategy for Algeciras (ERDF)

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