

Strategic Policy Forum on Digital Entrepreneurship



Blueprint for cities and regions as launch pads for digital transformation

Recommendations of the Strategic Policy Forum on Digital Entrepreneurship

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Foreword

Cities and regions are essential complements to digital transformation. The changes brought about by the digital age mean that geographic boundaries are no longer the costly barriers to trade, communication and social interaction that they used to be. Yet at the same time, physical proximity is increasingly crucial to our collective prosperity: European cities provide up to 85% of the region's GDP, providing a high density of interactions among citizens and creating digitally-enhanced opportunities for education, specialization, creativity and shared services that increase productivity, efficiency and well-being.

We believe these opportunities can and should be grasped with purpose. The language of this report, a "blueprint" to build "launch pads" draws on the metaphor of engineering and design to indicate that citizens, local authorities, businesses and all other stakeholders across European cities and regions can thoughtfully collaborate to create a digitally-enabled future that is bold, inspiring and impactful. The ideas and case studies described in this blueprint show how diverse stakeholders across Europe have worked together to build partnerships, develop local talent and attract skills, employ novel sources of data and invest in infrastructure that drives growth and prosperity through digital transformation.

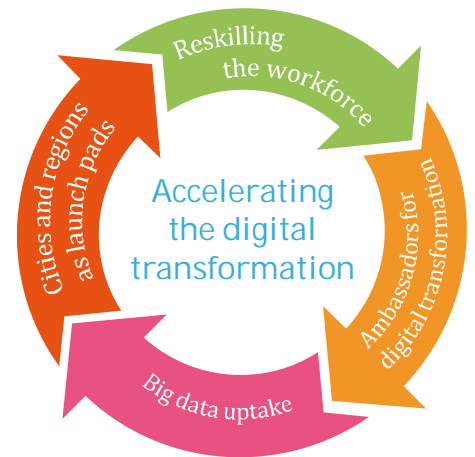
Furthermore, as the places where three quarters of Europeans live, cities allow us to be more inclusive. Jane Jacobs, the Canadian urban activist, wrote that "Cities have the capability of providing something for everybody, only because, and only when, they are created by everybody." In this and in many other ways, this report draws inspiration from the concept of "Smart Cities" while also having the ambition to go beyond it.

We hope that in reading this report, you come across new ideas and examples to help your city and region to be a purposeful engine of effective and inclusive digital transformation for all the citizens and organisations that connect to it.



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Published

- Big data and B2B digital platforms: the next frontier for Europe's industry and enterprises

- Cities and regions as launch pads for digital transformation

Forthcoming report

- Reskilling the workforce: digital skills for industry

Forthcoming toolkit

- Toolkit for decision makers to become ambassadors for digital transformation

Cities and regions as launch pads for digital transformation

Leadership and collaboration for a smart governance of the local digital ecosystem

- L1 Create a forward-looking digital strategy and build a shared vision around it
- L2 Build long-lasting partnerships and trust relationships
- L3 Collaborate across sectorial boundaries and value chains

Digital skills and entrepreneurs to accelerate the digital transformation process

- S1 Transform your local population into digital talents
- S2 Attract global digital talents
- S3 Develop an entrepreneurial culture

Access to data and technologies for applied solutions to local challenges

- T1 Develop a digital city strategy
- T2 Open access to data through the launch of open data platforms
- T3 Ensure local access to digital technologies

Key infrastructures and investments for digital launch pads

- I1 Ensure the availability of critical digital infrastructures for the digital transformation of local businesses
- I2 Secure investments in digital infrastructures
- I3 Ensure the economic sustainability of local investments in digital infrastructures

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Find out more and submit your own digital transformation initiatives at:
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Cities and regions as digital launch pads

Cities and regions are entering a new era of transformation. A digital transformation embracing social, economic, urban, mobility, educational, technological and cultural changes. The smart city concept which is gaining momentum globally already highlights the key investments being made for the technological transformation of cities and regions. Further, territories have an important role to play as launch pads for digital transformation by all and for all.

Cities and regions as launch pads for digital transformation

As cities and regions continue to grow, the prospects for those acting as launch pads for digital transformation become even more prominent. Being a digital launch pad entails the creation of the right environment to accelerate the digital transformation of businesses, organisations and public administrations. It is ultimately about improving the ecosystem in which residents live and businesses succeed as well as the services and activities that governments, firms and organisations deliver.

Retailers, SMEs, researchers, artists, craftspeople, teachers, and public officials have now started to adopt digital technologies to improve the way they work. These advancements are generating an unprecedented demand for new and better products, services and new skilled jobs. European cities and regions need to adapt to these changes if they are going to thrive in today's competitive global economy.

A new direction for city and region-based policy-making

Digital transformation impacts all types of cities from a village in a poor region to an established and wealthy capital. The digitalisation process is a winning game for all kinds of territories being able to leverage on their strengths and offset their structural or geographical weaknesses thanks to digital technologies. These opportunities open up new directions for city-based policymaking.

Activating the transformation

The digital transformation of European cities and regions is evidenced by concrete initiatives carried out by a multitude of actors. In Barcelona, makers in Fab Labs are rethinking production models. In Trento, policy makers have started to disclose and use mobility data to improve user experience. Social partners in Luxembourg are supporting talented unemployed people to sign up to Fit4coding to become ICT specialists. Public officials of the city council of Lund are working with the Mobile Heights Centre to find opportunities for the city to act as a test-bed for local companies.

These examples and many others showcased in the blueprint illustrate fantastic opportunities for European cities and regions to bring together local stakeholders and to mobilise them in order to accelerate the digital transformation process in a symbiotic ecosystem. They reflect the interconnections of all the players, not only the traditional ones who are collaborating to make the digital transformation a reality.

In our analysis of 13 city and region cases with diverse profiles, we have investigated the nature of projects, their origins, the local governance models, the funding sources and the success factors. We concluded that every village, city or region has a fantastic opportunity to use digital transformation as a catalyst for change. For the first time, all territories have the opportunity to fix some of the structural barriers which are hindering their growth such as lack of talent, lack of visibility and distance to work.

This blueprint is intended to serve as a catalyst to leverage all current initiatives on smart and sustainable cities. It sets out the incentives and the benefits for local stakeholders to act as digital launch pads. It defines the success factors and indicators or signals to measure them. The blueprint highlights the values attached to the creation of a digital launch pad such as generosity, innovation, sense of common interest, and desire to learn. It provides the design for building a sustainable network full of benefits for all generations.

Figure 1: Key dimensions to activate the digital transformation process



Critical attributes for a successful digital transformation process

Cities and regions have the capacity to create a symbiotic ecosystem to nurture the modernisation of businesses, notably through the uptake of new business models and digital technologies. The blueprint showcases the digital experiences of 13 cities and regions bringing together “the old and the new digital economy”, to cross-fertilise them and accelerate the digitisation of their economy. Other cities are learning from these best practices to build their own centres of digital transformation.

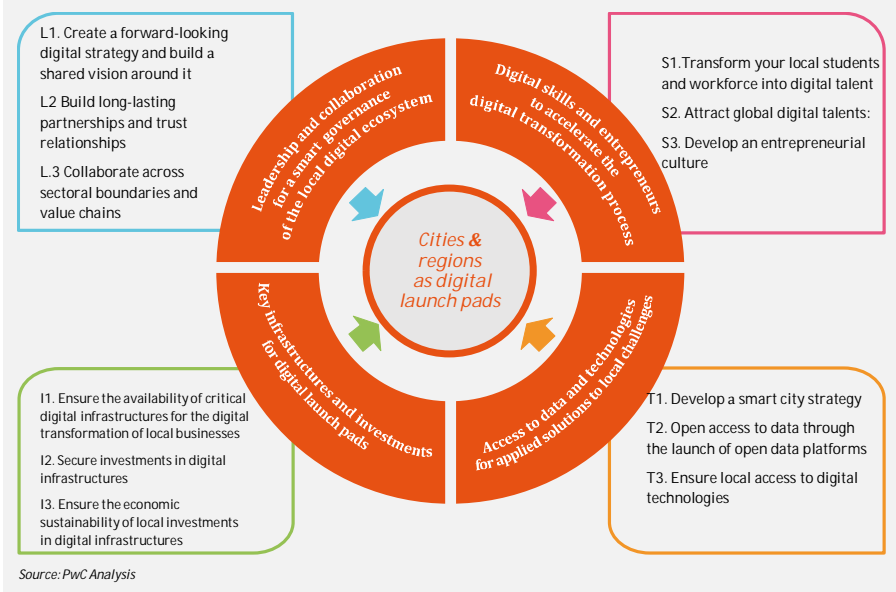
Reflecting on the digital experiences of these cities and regions, we have identified four attributes on which local stakeholders can leverage to truly help their cities and regions to go digital. These attributes, or dimensions, were selected based on the thorough analysis of qualitative data collected from different city stakeholders acting in different contexts and in territories with uneven levels of digital maturity.

In each of these cities and regions, the digital transformation process was enabled by one or several attributes. For each attribute, we have identified the three key success factors which can contribute to the creation of a favourable digital ecosystem.

European cities and regions can be successful in one attribute but still catching up on another. Each stakeholder therefore needs to self-assess where their city or region stands on these four dimensions in order to pick up the right initiatives that can help them get to the next level.

The blueprint contains context-specific local examples enabling individuals to upgrade the digital maturity of their territory by designing their own “à-la-carte” roadmap.

Figure 2: 4 critical attributes and 12 success factors for a successful digital transformation process



1. Leadership and collaboration for a smart governance of the local digital ecosystem

Visionary, proactive and engaged leaders are critical to introduce and drive new digital initiatives in a city or region. They have the ability to articulate a clear vision and to paint a picture of the future for their organisation but also for the whole territory. Individuals able to challenge the status-quo, to lead with confidence and to rally actors across sectors and industries are therefore key for the transformation of the territory.

3. Access to data and technologies for applied solutions to local challenges

Access to data and technologies can act as a catalyst for change. In every organisation, digital solutions have the capacity to replace old and sub-optimal management styles by newer, more efficient ones. Digital solutions also offer unprecedented opportunities to improve the way we live and work.

2. Digital skills and entrepreneurs to accelerate the digital transformation process

The digital transformation of a territory is only possible if local businesses have the right talent with the relevant skillset to acquire and harness the required digital technologies. Digital talent is not only important for local companies. Local administrations, universities, and research centres also need to attract key talent, entrepreneurs and intrapreneurs with the ability to radically shape the city's digital ecosystem.

4. Key infrastructures and investments for digital launch pads

Physical and digital infrastructures are required to optimise the use of resources and enable a higher quality of life in every territory. Innovative financial and business models are increasingly emerging to finance these sometimes costly but indispensable local technological infrastructures.

Towards interregional collaborations at European level for industrial modernisation and investments

EU Member States and regions have already developed smart specialisation strategies to guide their innovation-related investments and moved now to the implementation phase. However, this process has so far remained focussed on individual regions. In order to accelerate the implementation of smart specialisation strategies in the EU and increase the competitiveness and innovation capability of the EU industry, it is important to reinforce linkages between EU regional and industrial policy, with a view to

facilitating the development of a pipeline of concrete ambitious investment projects across the EU. This process will be facilitated by establishing at EU level a Smart Specialisation Platform on Industrial Modernisation and Investment.¹

The new Platform on Industrial Modernisation, which will be launched on 1st June 2016, will assist regions and member states in their efforts to develop existing and new value chains through the interconnection of regional innovation eco-systems and their

innovation actors, in specific investment areas related to industrial modernisation (such as for example digital and key enabling technologies (KETs), resource efficiency, creative industries, etc). The Smart Specialisation Platform on Industrial Modernisation aims to facilitate concrete cross-regional innovation that could be supported through the European Structural and Investment Funds, Horizon2020, COSME and the European Fund for Strategic Investments (EFSI).

Become a digital ambassador in your territory

Digital transformation forms part of the local entrepreneurial discovery process. Everyone has a role to play in its organisation and in the ecosystem. With the blueprint in your hands, now is the time for you to act!

The transformative power of the digital revolution will reach your city/region much quicker than you expect. Whether you wish to take the first steps or to improve the level of digital maturity of your city, the blueprint will steer you in the right direction. Whoever you are, wherever you are, the showcased examples of successful initiatives provided in this blueprint demonstrate that you can make a difference. Dare to try!

Since local and regional stakeholders all have a single but complementary role to play when embarking on the digital transformation journey, figure 3 outlines the main role to be played by each stakeholder in shaping their digital ecosystem.

Guiding stakeholders with concrete ideas for actions

“Shakers and makers” of each digital ecosystem have the ability to drive the shift from a top-down to a bottom-up governance of their digital ecosystem.

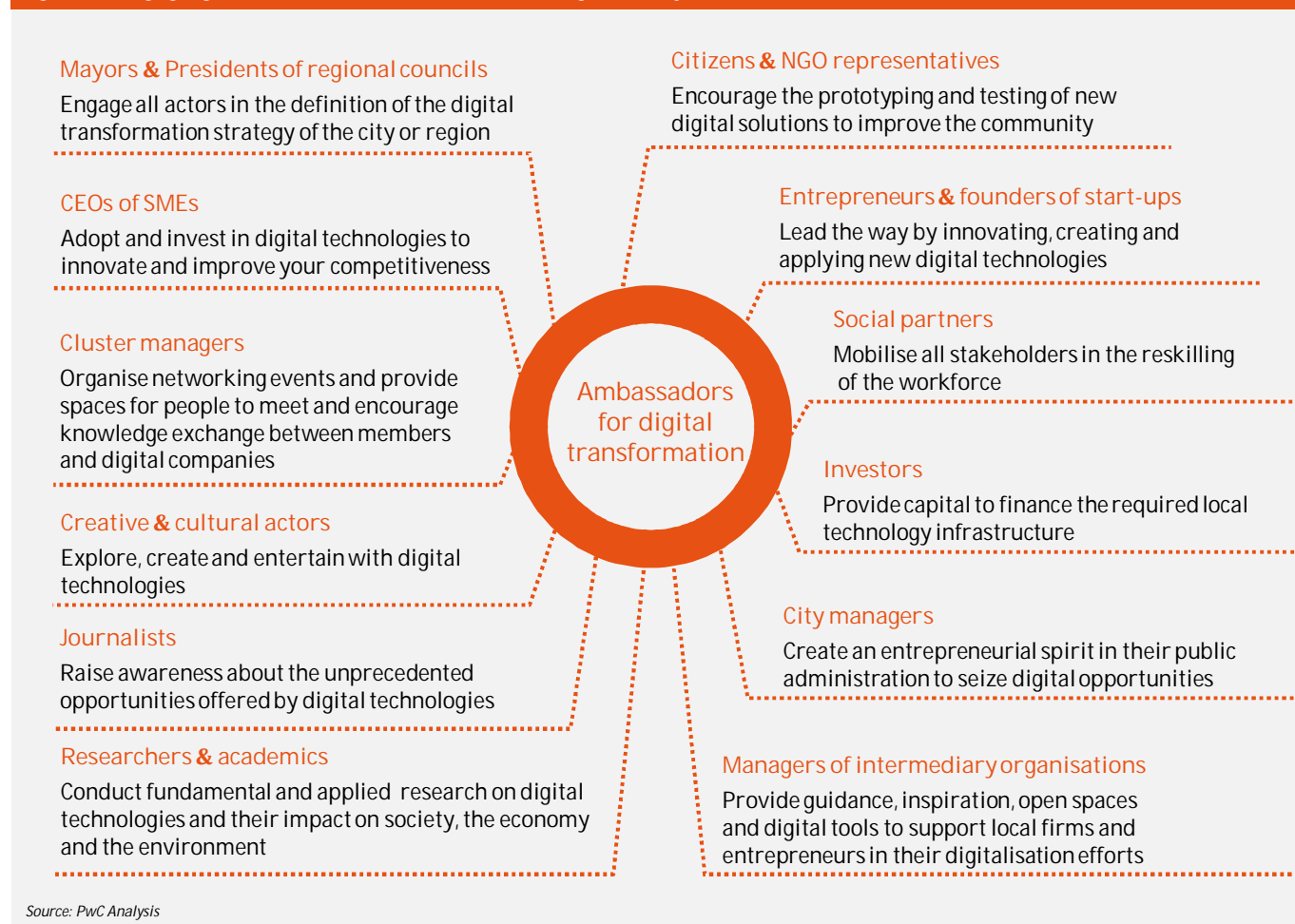
The blueprint serves as a practical guide for the stakeholders of a local ecosystem on how to take concrete actions to unleash the digital potential of their territory. Many questions arise when thinking about cities and regions as true enablers of digital transformation. What does it mean? Who has a role to play? What can I do to make it happen? How do I mobilise other stakeholders? What will be the impact?

Key recommendations matching the profile of each category of digital ambassadors have therefore been developed to guide local stakeholders throughout their digital journey. The examples of 13 local digital experiences are also key to turn these local stakeholders into active digital ambassadors.



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Figure 3: Engaging the “shakers and makers” of the digital ecosystem





Leadership and collaboration for a smart governance of the local digital ecosystem

Networks and collaborative projects can take different shapes but they all need to be driven by visionary local leaders. City mayors and regional government leaders are often considered as the typical leaders of digital initiatives. However, digital territories can be supported by local leaders from diverse sectors and backgrounds. The development of smart digital ecosystems requires coordinated action on multiple levels: between local businesses but also between businesses and local governments, universities, citizens and support organisations. Understanding the role of collaborations (practical and digital), networks and how stakeholders in the digital ecosystem can complement each other, interact and cooperate is crucial to bring forward win-win opportunities for all parties.

Rarely has collaboration been so important for the governance of local ecosystems. In an interconnected, volatile and rapidly changing world, partnerships, networks and joint ventures are critical to bring about a favourable digital ecosystem. However, the launch of digital initiatives often entails the creation of competing interests from various stakeholders such as private sector organisations (e.g. large companies, start-ups and investors), different layers of governments, and universities and research centres.

Leading collaboratively has therefore become an imperative to succeed in these multi-stakeholder environments. Without the right sort of (inspired)

leadership, digital stakeholders cannot work together successfully to achieve this transformation. Local stakeholders need to realise and accept that interdependence is a reality in order to span geographical, hierarchical and organisational boundaries.

3 key success factors

- ✓ ① Create a forward-looking digital strategy and build a shared vision around it
- ✓ ② Build long-lasting partnerships and trust relationships
- ✓ ③ Collaborate across sectorial boundaries and value chains



Figure 4: Driving leadership and collaboration with the next generation of digital ambassadors



L1

Create a forward-looking digital strategy and build a shared vision around it

Forward-looking strategies require local leaders with a global view, high imagination and the ability to paint a vision with a high level of acceptance by the local population. The governance perspective is ultimately about taking responsibility to create the necessary platforms and engagement channels for stakeholders to take action. These platforms are relationship-based fora, serving the needs of the actors for the design of a digital transformation agenda, and building on the territory's economic strengths.

A forward-looking strategy and a shared vision of the future

Digital cities and regions bring people together to work and confront digitally-enabled challenges and to collaboratively explore the digital transformation opportunities. The existence of a shared vision (with strong and organizational and personal buy-in) of the future among local stakeholders is a precondition for the success of any digital transformation strategy. This forward-looking approach enables local governments to adapt their digital strategies prospectively, a must-have given the complexity of the digital economy and its disruption potential.

Nice's advisory Board

In Nice (France), an advisory board gathering representatives from local businesses and chaired by the president of Amadeus, the global IT company, was created by the economic development agency to keep pace with the latest technological advances likely to have an impact on the region's economy.³

Leveraging on the territory's economic assets

The local digital strategy also entails the identification of the right industry focus linked to relevant cluster areas of the territory (e.g. ICT, creative, health, well-being, life sciences). The smart specialisation strategy of the region can serve as a practical reference for the identification of the right industry focus. The city government acting as a thought leader is therefore responsible for the

alignment of the city's internal digital strategy with the territorially agreed digital strategy.

Local leaders for an inclusive and collaborative digital ecosystem

City mayors and regional government leaders are considered as the typical owners of the digital initiatives. However, digital territories can be supported by local leaders from diverse sectors and backgrounds.

Local companies seeing the potential for new revenue streams and aiming to capitalize on consumer's interest in all things digital are eyeing opportunities to engage and collaborate with city decision-makers on the digital transformation of local businesses. Academic institutions and research centres are also key actors of the digital ecosystem creating the digital talents needed for the digital transformation of the territory.

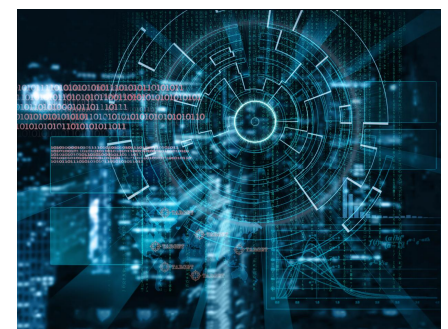
Citizens and especially the civic tech community can also play the role of change makers advocating and acting for the digital transformation of local businesses. All these actors of the digital ecosystem interact, exchange and choose their partnerships and collaborative projects. By taking actions and seeking new collaboration opportunities, these stakeholders can all lead the way for the digital transformation of local businesses.

Visionary individuals shaping the digital transformation of the local economy

Digital initiatives enabling the digital transformation of cities and regions are often driven by forward-looking individuals rapidly realising the opportunities of the digital transformation of their local economy. Defining the necessary new work processes entail cracking the digital transformation code. It is about enabling the emergence of new ideas, active cross-sectorial networking, digital activism and the redefinition of entrepreneurship (business, political, academic, social and societal entrepreneurship). These radically new approaches can only be carried out by visionary individuals acting as leaders and further developing awareness and insights for the digital transformation of their city or region. This role of connector and facilitator is critical for the successful implementation of any digital strategy.

Leadership does not have to come from a public authority

Local governments have a key role to play in the creation of long-lasting partnerships and trust relationships between all the stakeholders. However leadership should not be regarded as the preserve of local authorities. Cities and regions provide a space to challenge and push the public sector to take an entrepreneurial approach to digitalise industries. However, digital cities and regions also attract people and investments; therefore, if industries get in line with the digital spirit of the territory, they have access to a broad market. This can serve as an incentive for their digitalisation which encourages the private sector to take leadership in the digital transformation process.



Espoo Innovation Garden: harnessing the power of collaboration to boost innovations

The Espoo Innovation Garden is poised to shape Espoo as Europe's digital star. The term "Espoo Innovation Garden" refers to the innovation ecosystem and the creative working styles along with the co-creation culture that it aims to unleash. The concept was selected as a metaphor recalling the fruitful collaborative activities that are necessary to build the best possible environment for entrepreneurship.

The Garden connects the Aalto University with the VTT Technical Research Centre of Finland. With a total of 5,000 researchers, 25 R&D centres, a vast number of Finnish and international companies bringing together workers from more than 100 nationalities. The Espoo Innovation Garden has created a digital ecosystem favourable to the digital transformation of its local businesses. The launch of the Espoo Innovation Garden in 2014 illustrates the city's strategy to encourage collaboration between the local stakeholders of the digital ecosystem.⁴

L2

Build long-lasting partnerships and trust relationships

The ability to create a shared digital strategy relies on the existence of trust relationships between local stakeholders. Long lasting partnerships based upon mutual trust and linked to practical work are therefore critical. These collaborative activities manifest a kind of collective and informal leadership team who have great interests in advancing the digital level in a territory. This approach actually creates a new leadership model that innovates, redefines and cultivates a multi-helix ecosystem.

City governments as facilitators and coordinators of the digital ecosystem

Creating a favourable environment for the emergence of a digital ecosystem is crucial. Local governments have the ability to bring together local resources and to facilitate collaboration between academia, industry and policy makers, fostering digitalisation and creating new business opportunities.

The digitalisation processes are not easy to reach, as such processes deeply vary from to city to city. However, there is one aspect that is present in the digital process of each and every city and this relates to the willingness of the public sector to embrace a holistic approach including different actors during the transformation and making sure that digital opportunities offered by the transformation are not missed.

Future by Lund

Future by Lund is an innovation platform stimulating an entrepreneurial culture. The platform gathers the municipality of Lund, Ideon, Kraftringen, Lund University, Eon, Region Skåne, Sustainable Business Hub, SP, Akademiska Hus and Siemens in order to solve urban challenges with products and services for smart and sustainable cities. Future by Lund does not only connect these digital stakeholders, the platform also serve to assist them throughout their digital initiatives in an open innovation process. The efficiency of the platform is notably assured though the focus on three challenges faced by the city: Mobility, smart energy systems, and lighting and illumination.⁵

Using trust to balance formal internal organisational process leadership and external informal territorial leadership

At the same time the individuals in this external ecosystem have a clear and formal internal role of leaders of a special organisation on this territory. One example can be the CEOs from different industries working together with the City manager, the head of the university, the head of the hospital and leaders from the not for profit sector on a e-health-related solution.

The task for another group of actors could also be to create a new digital branding platform for a city but at the same time to create and implement a smart city strategy for a part of a city linked to one of Europe's biggest research plants. This involved all kind of sectors, industries and stakeholders; not just in the city itself creating the demand for new collaboration platforms and access to high tech private industries to test rapid prototyping and test bedding activities.

Building long-lasting partnerships

Success requires deep, long-lasting collaborations. Cross-sector collaborations need to be supported by all the actors of the digital ecosystem. Institutions hold networks and know-how that are vital to innovation and that need to be activated to create new collaboration opportunities. Trust, flexibility, commitment and care from all parties are essential.

Entrepreneurship, a shared vision and risk-taking approach are essential, as well as support from professional services firms and other big players in city as a result of long-lasting partnerships and trust.

Tapping into a variety of forms of partnerships for digital transformation

- ✓ Public Private Partnerships
- ✓ Mergers & Acquisitions
- ✓ Subcontracting,
- ✓ Research cooperation,
- ✓ Technical cooperation,
- ✓ Technical assistance,
- ✓ Licencing,
- ✓ Manufacturing agreement,
- ✓ Franchises,
- ✓ Reciprocal production,
- ✓ Joint Ventures.

Overcoming low levels of local engagement for digital transformation

The cost of inaction can be demonstrated so as to make digital more palatable to cities, regions and businesses, since the return on investments is hard to demonstrate in the digital sector. The discussion of leadership needs to be addressed in two dimensions. There is a clear change from a city internal organizational approach to a city external territorial approach.

The second approach helps to lead people in an external multi-stakeholder process with all stakeholders involved on the territorial area. Some pioneering prototypes and examples of arranging informal territorial sector leadership teams already exists and should be further replicated.

In order to do so, communication and proximity between local stakeholders is key. Digital technologies offer the chance to reach out to a larger share of the local community and could therefore be used to achieve a higher level of engagement between the local stakeholders of the digital ecosystem.

Activating citizen engagement

The technological changes that have taken place over the last few decades are bringing citizens closer to a new definition of production in relation to the city.

These changes go far beyond traditional citizen participation, redefining the operating model of the city, not just politically, but also in economic, social, cultural, environmental and geographic terms, ultimately creating the "productive citizen, or maker or do-er". Digital cities and regions are in a mental transition process under the banner "smart citizens".⁶



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L3

Collaborate across sectorial boundaries and value chains

Territorial leadership is key for the digital transformation of any European city or region. It is about getting an external focus of leadership independently from where it emanates. It is about coming together and inspiring different actors to take common actions that change and manifest digitalisation in daily working operations.

Creating cross-sector and cross-industry territorial leaders

Local digital initiatives can move forward far more rapidly when leaders come together and take a common responsibility for a plot of land (such as the territory of a city).

If all the key leaders of a certain territory step forward to work together, challenge and encourage each other's, they can easily reach the hoped-for digital strategy. A key attitude in this process is to work in the so called in-between spaces, the interfaces between sectors, industries and issues on the actual territory.

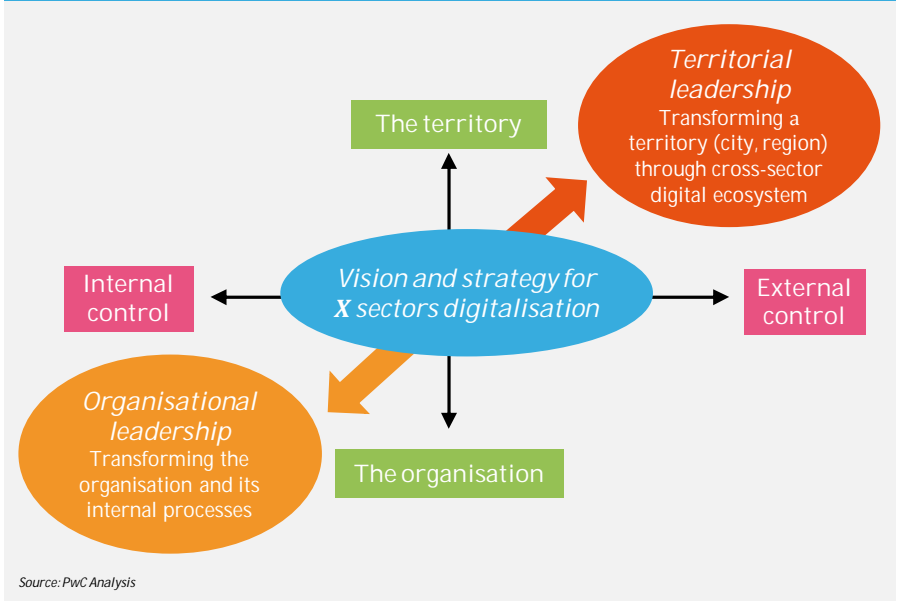
Leading in these in-between spaces require a special mind-set containing the following three key elements:

- a) A common understanding,
- b) The ability to co-create in unity and
- c) Generosity (especially when it comes to sharing ideas).

Cultivating the relational capital to develop new cross-sector partnerships

Interestingly enough, it is evidenced based that the relational capital is the key for business innovation and for the speed of renewal. New, fresh and ambitious initiatives from local leaders collaborating across sectors in order to create the necessary initiatives together are arising across Europe at an unprecedented pace. In the city of Lund (in the Skane region of Sweden), a lot of efforts have been made to ensure that real collaboration and "buy-in" between stakeholders from different areas exist. These collaborative stakeholders notably include city managers office, property and real estate owners, the university, not for profit organisations, the new issues-based cluster organisation, etc.

Figure 5: Leading in between the internal and external dimension



This relational capital between local stakeholders serves as a practical way to manifest an informal territorial leadership team linked to strategic issues such as vision and branding regarding the smart city approach in order to get a higher attractiveness for talents and investments.

Creating new collaboration opportunities

Established businesses are not great at disrupting themselves, so smart ways to engage with them should be found. Through a proactive approach collaboration can be used as a catalyst for digital transformation. For instance, by including innovative businesses as advisors in collaborative projects with established businesses. Increasingly, more examples are arising on partnerships between private companies and municipalities on developing ways to boost digital transformation at the city level.

Nimble technology companies are leading thanks to their first mover



advantage but large industrial conglomerates such as Siemens, IBM, Cisco and Samsung are catching up and investing heavily in digital city solutions.

One important issue is how the city organisation, procures, apply and let digital service companies test their technology in public service in order to accelerate innovation and digital transformation.

The role of culture

The existence of a low hierarchy can be part of a national culture. For instance, the Finnish culture encourages everyone to share ideas knowing that the targeted audience will listen and follow if they believe in the idea.

The passion for a better future is a key driver for Espoo citizens' engagement in the digital transformation of the city. The city government in Espoo does not only encourage innovation but also provides the rationale behind the need for innovation in the city.

This bottom-up mentality in Espoo is also illustrated by the actions of the city government as a moderator and a connector of stakeholders in the digital transformation process.

The creation of the concept of "Bench learning" reflects the sharing culture of the city where collaborative thinking and open innovation have become integral parts of the working style. The same approach can be noted in the city of Lund and the Lund university initiative - Innovation in mind with a focus digital transformation using the inner city area putting up huge tents for X collaboration.



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Digital skills and entrepreneurs to accelerate the digital transformation process

Digital talents are the backbone of the digital transformation of companies. The digital transformation of a territory is only possible if local businesses have the right talents to acquire and harness the required digital technologies. Digital talent is not only important for local companies. Local administrations, universities and research centres also need to attract key talents with the ability to radically shape the city's digital ecosystem.

Hiring and retaining the right talent with the appropriate skillset has become one of the most critical challenges faced by European businesses. In today's globalised and hyper-competitive world, talent acquisition strategies constitute a top priority for businesses to innovate and grow.

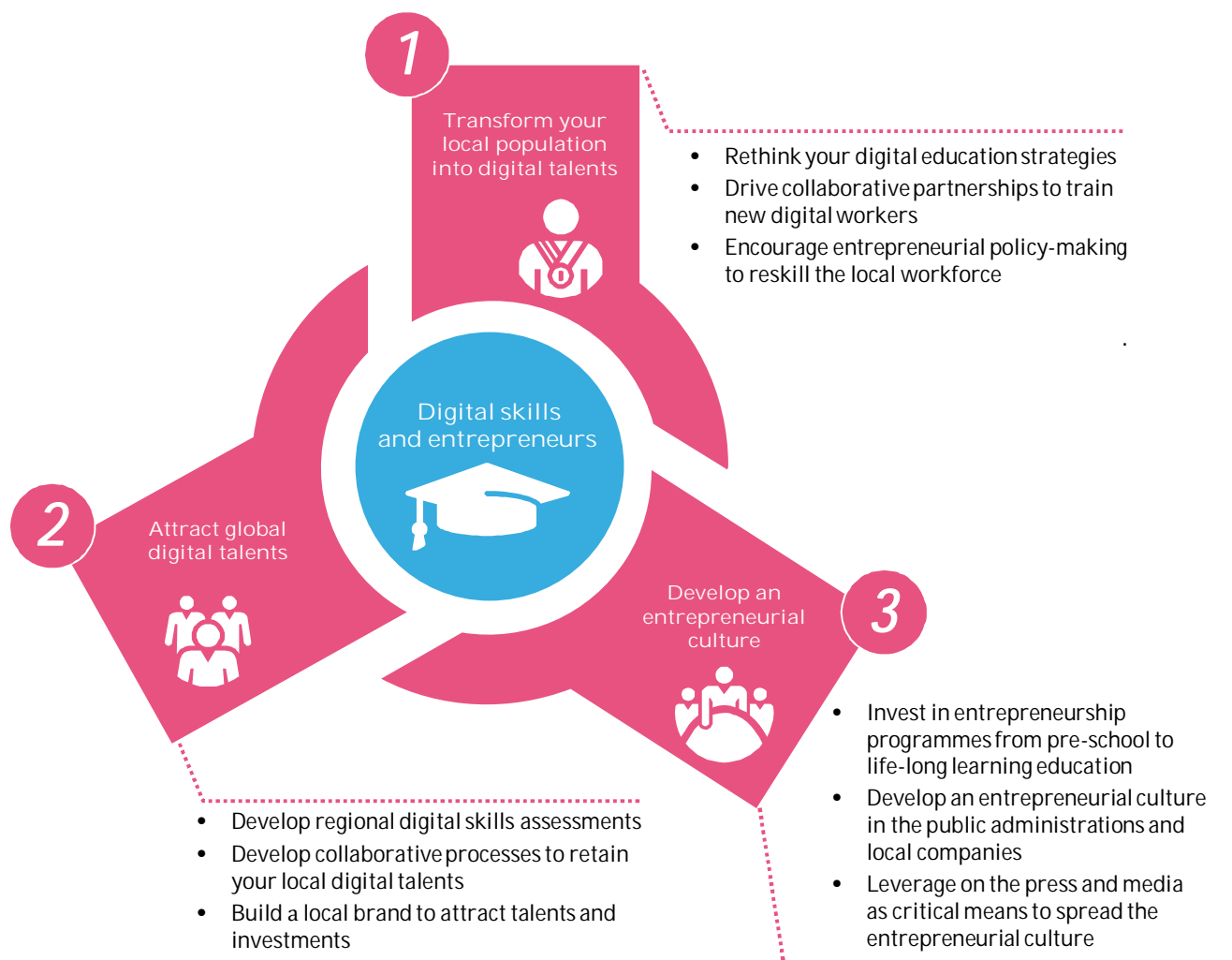
Public administrations have also entered the race for global talent as finding the

right individuals to work in the digital units of local public administration can prove to be particularly challenging.

Throughout Europe, SMEs and large companies are thinking talent first. European digital leaders are extremely mindful and aware of their talent challenges but often lack of knowledge or capacity about how to tackle them. SMEs and large companies in peripheral

areas as well as in the large metropolitan areas are all on the battlefield for talent.

In addition, some local or national governments focus too much on the promotion of headquarter offices, factory facilities or campus buildings rather than on the promotion of local talents.



S1

Transform your local population into digital talents

Digital skills have become the third language and age cannot be seen as a barrier to start learning it. As we enter a digital era, local leaders need to make sure that every single resident in their territory is able to acquire digital knowledge in the short and long term. In a world where technologies are becoming ubiquitous, there are simply no alternatives to digital literacy. Cities and regions failing to reskill their workforce won't be able to compete globally and they will inevitably see their economic attractiveness compromised.

Rethinking digital education strategies

Several dimensions have to be taken into consideration when rethinking education strategies. The first one is about getting the right vision at local level to acquire digital knowledge both on the short and long terms. This means the right content and the adequate curriculums for students including rapid learning programs. This approach is applicable for both local students and talented migrants.

The education sector ranges from pre-school to post doc level and also includes life-long learning. Iconic teachers are therefore indispensable throughout the learning pathway. Local business heroes also need to be emphasised in the area of digitalization. Similarly, the level of renewal and the speed of start-up communities including incubators and accelerators play a critical role. Rapid prototyping programs and skills management are other building blocks in the development process.

The native digitals generation need to collaborate with older generations in a creative-strategic-thinking approach. All together they can work for what could be labelled as "3G strategies" (3 Generations strategies). Three Generations working together and learning of from one another.

Collaborative partnerships to train new digital workers

In forward-thinking cities, local governments, education providers and companies are developing collaborative strategies to train new digital talent or to reskill the existing workforce.

Nokia's bridge programme

Nokia played a major role in the digital economy of Espoo. In its glory days, the Finnish multinational ICT company employed more than 23,000 workers in Finland. Over the past decade, the series of layoffs at Nokia and the acquisition of Nokia's mobile phone business by Microsoft have left the city of Espoo with a surplus of tech workers. Out of the approximately 100,000 ICT-workers in the country, about 14,000 ICT professionals (14%) have been affected by the mass layoffs of Nokia with a large majority of Espoo residents.⁷

The city of Espoo along with the national government, Nokia and education providers have therefore developed collaborative strategies to ease Nokia's strain and to turn it into Finland's gain. In 2011, Nokia launched the "Bridge programme" which aimed to provide new career opportunities to its laid-off employees. The Bridge programme led to the creation of about 1,000 business start-ups by former Nokia workers who benefitted from the entrepreneurship programs and the investments made by Nokia to (re)train its former labour force.⁸



Universities: hitting new heights to foster a new digital workforce

The key role of the university in driving forward a favourable digital ecosystem was repeatedly stated by different stakeholders of the city of Espoo. Creating tighter linkages between universities and businesses therefore acts as a key success factor for the digital transformation of local businesses.

In Espoo, all the initiatives developed by the Aalto university aim to facilitate the digital transformation of local firms (Aalto Design Factory, Aalto Venture Garage, Aalto Camp for Societal Innovation,...). These initiatives are praised by local businesses who are increasingly relying on them to innovate.

Encouraging entrepreneurial policy-making to reskill the local workforce

Entrepreneurial policy-making has become a reality in a growing number of European cities and regions as reflected by the emergence of an increasing number of public entrepreneurs focusing on the digital challenges faced by local firms. However, the reskilling of public sector servants remains a key issue in a considerable number of territories. It is important for the public sector to act as a strategic enabler and facilitator in these processes.

Hiring the right policymakers with an acute understanding of the needs of local firms and tech entrepreneurs and the development of the entrepreneurial skills of existing public servants is therefore key to create the conditions for sustained digital transformation. A practical approach which also helps to build the digital brand of the territory and to accelerate the reskilling of the workforce is to appoint a "CDO" – Chief Digital Officer as the responsible person for this integrated development x sectors and industries.

Nyuko: Turning Luxembourg into a start-up nation

Nyuko was launched in 2015 as an initiative hosting and helping entrepreneurs to articulate their business plans and early stage ideas.⁹ Nyuko takes local entrepreneurs to the next level by accelerating the transformation of their ideas to the launch of a start-up. After their Nyuko experience, entrepreneurs are ready to enter to incubators and accelerators in Luxembourg to grow their businesses. Nyuko was created as an independent structure and resulted from the merger between Business Initiative and the co-working platform "The Impactory". Nicolas Buck, a Luxembourgish entrepreneur and former head of Business Initiative carried the vision for the creation of Nyuko, a space for exchanges, training, and sharing between entrepreneurs, investors and coaches. Nyuko is composed of energetic and inspirational entrepreneurs offering the 3 following lines of services to new and second chance entrepreneurs.



S2

Attract global digital talents

Throughout Europe, SMEs, large companies, public administrations and other organisations are thinking talent first. European digital leaders are extremely mindful and aware of their talent challenges but often lack of knowledge or capacity about how to tackle them. Getting these talents entails cracking the city/region brand attractiveness for talents to come. Strong collaboration between local companies and the public sector is key to create a well-known brand, for investing locally and being a magnet for recruitment of talents for the future.

Retaining local talents: a collaborative process

The role of local universities, science parks and public research institutions should not be underestimated in the retention of local talents. In many cases, these academic institutions are world-class clusters in several fields that make intensive use of ICT and therefore act as an incentive to retain local talents.

In this regard, universities sometimes need to acquire or reinforce their expertise in particular areas to ensure their attractiveness. Strategies to implement the required changes include for instance the creation of partnerships with other academic institutions already renowned in the sought-after sector.

Public administration can also play a leading role in the retention of local digital talents. The engagement of the city of Espoo in the retention of the laid-off employees of Nokia was reflected by the creation of the "Task force for the structural change in the Metropolitan area".¹⁰

This network-based collaboration model gathered companies, educational institutions and career planning services. The aim of this collaborative action was to survey the skill and recruitment requirements of companies in the metropolitan area in order to provide advices and trainings to Nokia's laid off employees on how to meet those requirements. The success of the initiative is illustrated by the high number of former Nokia employees who found new career paths and employment opportunities thanks to the program.

Promoting local talents, not factories or businesses

Some local or national governments focus too much on the promotion of headquarter offices, factory facilities or campus buildings rather than on the promotion of local talents. During the restructuration strategies of companies, public authorities should concentrate their efforts on the retention of regional talents in the territory. The ability to innovate and to enable the digital transformation strategy of a territory lays in the hands of the talented people working in the territory.

Developing regional digital skills assessments

The availability of regional skills assessment is critical to enable education providers to equip local students with the skill-sets required in the territory. A necessary ingredient in this type of strategies is the open data policy and approach including open cloud and other defined issues in this space. The "open data" issues – cloud, source, codes and platforms etc. is one very powerful tool in making the digital strategy go life for all living, working and visiting people of the territory.

Cross-border cooperation for a strong digital talent pipeline



WebForce3, the very first coding school of Luxembourg opened in November 2015.¹¹ The coding school intends to provide jobseekers with the required skills to immediately work as integrators or junior developers after the 490 hours of training of the programme.

The school is operated by the French digital campus "NumericALL" located less than 100km across the French border.¹² By contributing to the training of web developers on both side of the border. As evidenced by the progressive shift from iron mining to digital currency mining, Numericall aims to turn this historically industrial region to a digital territory.



Cluster excellence as a magnet for global digital talents

Intermediary organisations and clusters are cornerstones for the change of mind-set towards innovation and digital transformation.

The creation of incubators and accelerators are mainly privately-led initiatives which proved essential to foster open innovation and digital entrepreneurship in the city. In Espoo (Finland), the presence of clusters such as the gaming cluster or the health cluster is attracting different types of talents from all around the world.

ICT Central Poland Cluster

Created in July, 2012, the ICT Central Poland Cluster act as a means to raise awareness of the educational and career opportunities offered by the IT industry in the region of Lodz.¹³ Through the creation of the cluster, Lodz University of Technology also aims to accelerate the uptake of ICT as an enabling technology for various sectors of the economy of the region.

Building a local brand to attract talents and investments

The development of a local brand results from the definition of a common vision and purpose for the city shared by all local stakeholders and especially by citizens. The creation of a local brand is not simply about the design of a slogan or a logo. It is about getting all the stakeholders engaged in the promotion of collaboration, experimentation and openness.

The existence of a cultural vibrancy for the city recognised and legitimated by local residents has the capacity to increase the global reputation of any city which can ultimately attract talents and investments. In a digital transformation perspective, territorial leaders should think about the unique characteristics of their city and the digital strengths that could create a local community to drive a meaningful local brand.

Strong collaboration between local companies and public sector is one key to enable a well-known brand to be investing locally and to become a magnet for the recruitment of talents. The ambition of the public sector is needed to co-create and collaborate with the digital industry in order to apply digital technology in all areas. If entrepreneurs get local clients, their likeliness to stay on the long-term in the city or the region increases dramatically.

Clients increase the value of companies and make it easier to get next round of venture capital, they therefore enable companies to recruit talents. This is a solid base for making a positive story telling of the local city/region and this will attract talents in different sectors.

S3

Develop an entrepreneurial culture

Europe needs more entrepreneurs to speed up the digital transformation process. Business entrepreneurs, social entrepreneurs, societal entrepreneurs, academic entrepreneurs, political entrepreneurs, cultural entrepreneurs as well as public and private intrapreneurs are critical to drive forward the digital shift.

Widening the definition of entrepreneurship

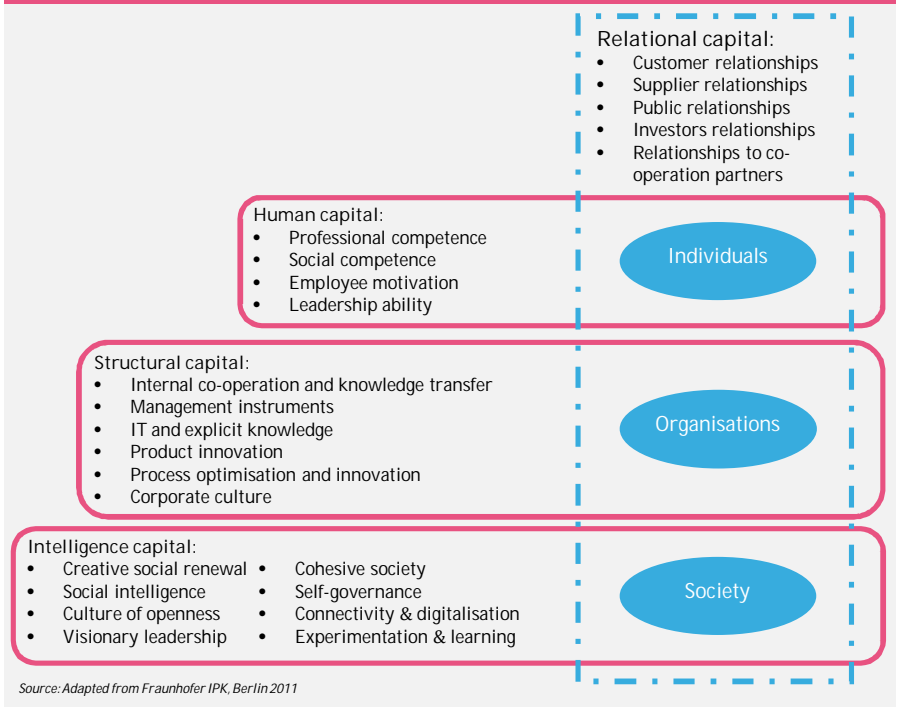
An entrepreneur is a person that takes initiatives to achieve one or different goals. Entrepreneurs can therefore be found in many sectors and industries. Clearly, we need great and passionate entrepreneurs in the following areas if we want to speed up the digital skills and their effectiveness:

- Business entrepreneurs
- Social entrepreneurs
- Societal entrepreneurs
- Academic entrepreneurs
- Political entrepreneurs
- Cultural entrepreneurs

Creating an entrepreneurial culture is a life-long political and practical process. It starts with the philosophy in the pre-school and elementary schools and up. The components needed for creating long-term entrepreneurial culture is: risk-taking, robust relationships based upon trust in and between sectors, financial industry presence (money) professional services and an attitude of sharing and generosity. Again we see the true need for a “3G” society to be in the making when different generations are working together with mutual learning as the result.

The culture creating process is very much a co-creating process between public and private sector including citizens. The figure below illustrates the expected attitudes and trends in the future collaboration in the interface between the stakeholders.

Figure 6: Relational capital as the basis to develop an entrepreneurial culture



Developing an entrepreneurial culture in the public administration

Hiring the right policymakers with an acute understanding of the needs of local firms and tech entrepreneurs and the development of the entrepreneurial skills of existing public servants are therefore key to create the conditions for sustained digital transformation.

Social intelligence and intellectual capital for local entrepreneurs

A key issue for the creation of an entrepreneurial culture is the approach to social intelligence and the intellectual capital of a city, region and a nation region. We see the three following levels in the social intelligence system for local, regional and national development of relationships capital that has to be: managed, lead and developed:

- Intelligence capital and society level: different societies are interconnected and shared to develop knowledge and business intelligence;
- Structure capital and organisational level (companies, public sector organisations, not for profit or research organisations): how different organisations are interconnected in sharing knowledge;
- Human capital and the different creative individuals: the level of interconnectivity between individuals.

From connectivity to “contactivity”!

All these levels can be perceived from a technical approach: “the connectivity”. This connectivity is a good beginning to start leveraging on the IC and knowledge capital. The exponential opportunity only comes at a later stage when real solid contacts have been established.

The press and media as critical means to spread the entrepreneurial culture

The press and media play a vital part in recognising, stimulating and promoting the success of local entrepreneurs. The positive media coverage of success stories from (tech) entrepreneurs has the ability to inspire a new weave of forward-thinking entrepreneurs. There can be no genuine development of an entrepreneur-friendly culture without media and more specifically business-reality programmes. These programs can have a positive effect on social norms and values associated with entrepreneurship.

Press and media can also indirectly influence both the will to start an entrepreneurial venture. At last, positive media coverage can be complementary to policy initiatives aiming to stimulate entrepreneurship. For instance, media could cover awareness campaigns to tackle the stigma of failure that is too often hindering entrepreneurs from starting a new company.¹⁴



Access to data and technologies for applied solutions to local challenges

As living labs, cities and regions allow the testing of solutions, create a favourable economic environment and thus help to foster the digitalisation of industries. Cities and regions across Europe are striving to act beyond the simple publication of available information, by demonstrating concrete applications illustrating the key benefits of open data initiatives. Ensuring local access to technologies and data has become a catalyst for change. It increases the accountability of local governments, the creation of citizen-centric and more efficient public services as well as the emergence of the right framework for local firms to experiment and innovate and to develop real-time city technologies.

European cities and regions need to move forward and address issues related to smart innovation and the creation of the right framework and space to experiment with more innovation and digital transformation. By opening up their public datasets online, cities and regions have found a new opportunity to spur innovation and economic growth.

However, the cost for the collection and processing of public data can sometimes

prove prohibitive and therefore raises the question of the monetisation of data. The majority of local governments make their data freely available however a considerable part of local authorities are rethinking their open data strategy. Different license models exist for the provision of public data. There's no doubt that the smart city movement is growing by leaps and bounds.

3 key success factors

- ✓ ❶ Develop a digital city strategy
- ✓ ❷ Open access to data through the launch of open data platforms
- ✓ ❸ Ensure local access to digital technologies



The future of cities and regions is digital

The future of digitalisation seems to be a strategic mix of interconnectedness, accelerating and multi-dimensional business development with exponential opportunities regarding value creation processes.

A comparison between traditional analog logic and the new digital logic provides a clear focus on some of the important differences between the two logics.

Comparison of analogue vs digital society

Analogue Society	Digital society
<ul style="list-style-type: none"> • Standardisation of products, services and innovations • Linear expectations regarding development • Contactivity - Human Relationships • Reactive or proactive approach - Too early or too late 	<ul style="list-style-type: none"> • Non- standardisation and personalisation of products & services • Exponential expectations regarding development • Connectivity - Technical Relationships • Interactive approach - Real time & just in time

T1

Develop a digital city strategy

Activities related to governance, planning and city management are re-shaped by ICT, which provides a new dimension making it citizen-centric, efficient, accountable and transparent. The way in which many public services, such as outdoor lighting, parking, mobility services, kiosks, location-based services, sensor-based water defences, physical infrastructure monitoring and controls, and smart energy grid services are developed, validated and scaled will change as local governments invest in a smart city strategy.

Tapping into the potential of open innovation

European cities and regions need to move forward and address issues related to smart innovation and the creation of the right framework and space to experiment with more innovation and digital transformation. The mobilisation of all relevant resources could be used to achieve this goal (e.g. EU structural funds, public procurement, Horizon 2020 research and innovation programme).

DigiEspoo: using digital technologies as a driver for public sector innovation

The city of Espoo decided to launch Digi Espoo, a crowd solving tool consisting in bringing real life challenges to the table of developers and SMEs in order to ask them to solve these challenges. The city of Espoo intends to enable policy makers to get a better understanding of the new opportunities driven by the digital revolution through the use of digital solutions to solve their management challenges. This initiative therefore serves to raise the awareness of policy makers on digital technologies. Mindful of this awareness, they will be better equipped to design policies in support of the digital transformation of local businesses.

E-government activities as a driver for digital transformation

Digital breakthrough in the reduction of old solutions have the capacity to make a sub-optimal management styles in the public sector. The online delivery of public services can also serve to accelerate the digital transformation of local businesses. In the region Provence Alpes Cote d'Azur, one out of two SMEs uses e-government services for tax declarations. If the primary purpose of e-government activities is to improve the efficiency of governments interactions with businesses, these online services also have a demonstration effects for local firms (especially for SMEs). For many companies, e-government activities constitute a model for online service delivery providing companies with new incentives to trust the security of on-line transactions.

Multi-level governance to drive the digitalization of the city of Tallinn

In Tallinn many initiatives have had a significant impact in the development of the digital strategy of the city. At national level, e-Government services are driving the digital transformation process. The e-Residency digital service offers a transnational digital identity to anyone interested in administering a location-independent business online. The national initiative enables secure and convenient digital services and facilitates credibility and trust of online transactions. In 2009 Tallinn implemented a new smartcard ticketing solution, requiring passengers to register their trip using a personal contactless card when entering vehicles.¹⁵

Smart cities: driving public sector leadership in digital transformation

There is no doubt that the smart city movement is growing by leaps and bounds. The way in which many public services, such as outdoor lighting, parking, mobility services, kiosks, location-based services, sensor-based water defences, physical infrastructure monitoring and controls, and smart energy grid services are developed, validated and scaled will change as local governments invest in a smart city strategy.

Ultimately the digitalisation of the city can serve as a model for companies to also engage their digital transformation strategy. Key technologies used by smart cities to enable digital transformation include:

- Key infrastructures in the area of public and private transportation and mobility – Charging infrastructure of electric vehicle (mopeds and cars)
- Internet of Things (IoT) to respond to high investment costs to build broadband networks;
- Broadband connectivity to tackle challenges related to some IP networks which are not yet IoT ready;
- Smart personal devices to address a raising digital divide while guaranteeing data protection and security;
- Cloud computing with challenges including security and privacy; complexity of managing cloud components and interoperability between clouds and vendor lock-in;
- Big data analytics to address a shortage of talent and assure data policies on privacy and security.

Trento Smart City

In Trento (Italy), the main obstacle in achieving a digital city vision concerns the inclusion of a wide range of actors, which can be part in different ways of a project of a city that wants to become smart and digital. In this respect, the main aim is not to build peaks of excellence, which the city already owns, but to create a favourable context where all citizens are aware of the role they can play and free to actively collaborate to such a collective plan.¹⁶



T2

Open access to data through the launch of open data platforms

By opening up their public datasets online, cities and regions have found a new opportunity to spur innovation and economic growth. The creation of open and interoperable technological architectures to release public data offers tech companies a live test bed for experimentation and demonstration. Open data strategies have the potential to radically reshape the traditional citizen-local government relationship.

Open cities: leveraging on the local data revolution ahead

By opening up their public datasets online, cities and regions have found a new opportunity to spur innovation and economic growth. The creation of open and interoperable technological architectures to release public data offers tech companies a live test bed for experimentation and demonstration. European local open data strategies differ in terms of:

- open and commercial models;
- governance and organisational structures;
- partnership approaches; and
- open data priorities and principles.

However, all open data strategies have the potential to radically reshape the traditional citizen-local government relationship. Open cities results from the necessity for cities to leverage digital transformation.

Open data platforms are an important component of success of smart cities which should act as open test beds. The online publication of public data allow for a prototyping and experimentation approach. It should be adopted to test solutions on a small scale especially since testing has become a gateway for industries to the population.

Open data platforms for public sector accountability and citizen engagement

In the new era of accountability, opening up public data has the potential to provide a platform for increased transparency and greater participation from the civic tech communities and large and small companies in local government decision-making and service delivery.

Measuring the impact of open data strategies

Numerous local governments are carrying out cost-benefit analyses to decide whether or not to launch an open data platform.

Given the difficulty to assess the tangible benefits stemming from these data platforms, local governments often lack of incentives to create them or to maintain and update the data regularly.

Although the direct impact of open data platforms can prove difficult to measure, evidence suggests that the creation of open data portals often leads to the development of digital solutions to tackle local urban societal and environmental challenges.

The creation of indicators to measure this impact is therefore a difficult but yet necessary task to effectively adapt open data strategies.

Potential benefits notably include social, environmental, political, economic and commercial dimensions that can only be measured through the use of relevant indicators. The Insight Centre for Data Analytics of Galway has created the Open Data Ireland Roadmap. This report has put forward a comprehensive plan to monitor the Open Government Data.¹⁷

Bristol is Open

Bristol has recently claimed to be soon the first ever smart city operating system that is pro-open standards and can offer bandwidth to developers and service providers as per their needs.

Bristol City Council is aiming to become one of the most important 'Internet of Things' test beds in the world, assisting international cities in their quest to become smarter and more digitalised.¹⁸



The cost for the collection and processing of public data

The cost for the collection and processing of public data can sometimes prove prohibitive and therefore raises the question of the monetisation of data.

The majority of local governments make their data freely available however a considerable part of local authorities are rethinking their open data strategy. Different licence models exist for the provision of public data.

Local governments need to find the right balance between the provision of entirely free Open Data platforms and the creation of platforms with different license options differentiating open data re-use for commercial and non-Commercial purposes. Local governments also need to consider the IP rights that can be attached to the datasets and therefore to the potential creation of restrictions to the re-use of data.

Ensuring the accessibility, interoperability and usability of datasets

Assessing government data accessibility and usability Digital European cities need common standards and interoperability.

Dealing with these hurdles by making all these datasets more accessible and useable would make it easier for local businesses and for the civic tech community to leverage on government data to tackle local challenges.



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T3

Ensure local access to digital technologies

European cities and regions need to move forward and address issues related to smart innovation and the creation of the right framework and spaces to experiment with more innovation and digital transformation. Digital technologies also offer the opportunity to look for more agile ways to address urban challenges such as rapid prototyping.

Digitalisation as an enabler for diverse societies

The digitalization process operates as a lever, an enabler and a facilitator creating a solid contribution to all the types of societies that we have had and still HAVE today. Inspired about Professor Rolf A Jensen's book, DREAM Society, we want to conclude that digitalisation is a kind of perfect match for all types of "society".

The digital advantages can be summarised as:

- Increasing density regarding the distribution of knowledge and innovation;
- Increasing frequency through the acceleration of iterations for strategic learning in society; and,
- Decreasing frictions in data transfer through speed and volume.

The role of Fab Labs

Fab Labs are spreading all across Europe. This makers' revolution is growing the local innovation ecosystems. Fab Labs were initially created to hack the companies.

Nowadays, companies are willing to discover the power of experimentation and are therefore starting to use the concept in companies, to reinvent themselves and innovate faster.

For instance, Airbus, the European aircraft manufacturer launch its own Fab Lab called "BizLabs". BizLabs constitute global aerospace business accelerators where SMEs, start-ups and entrepreneurs work in close collaboration with and Airbus intrapreneurs in order to turn ideas into innovations. Saint-Gobain, the global leader in the housing and construction markets recently launched its FabLab Factory.

Fab Lab Barcelona

The FabLab Barcelona is one of the leading laboratories of this worldwide network. It is currently developing projects in different scales, from smart devices for data collection by individuals, to the development of the new generation of Fab Labs in the Green Fab Lab project or to the new production models for cities with the Fab City project.²⁰



Lack of interest in digital technologies from local businesses

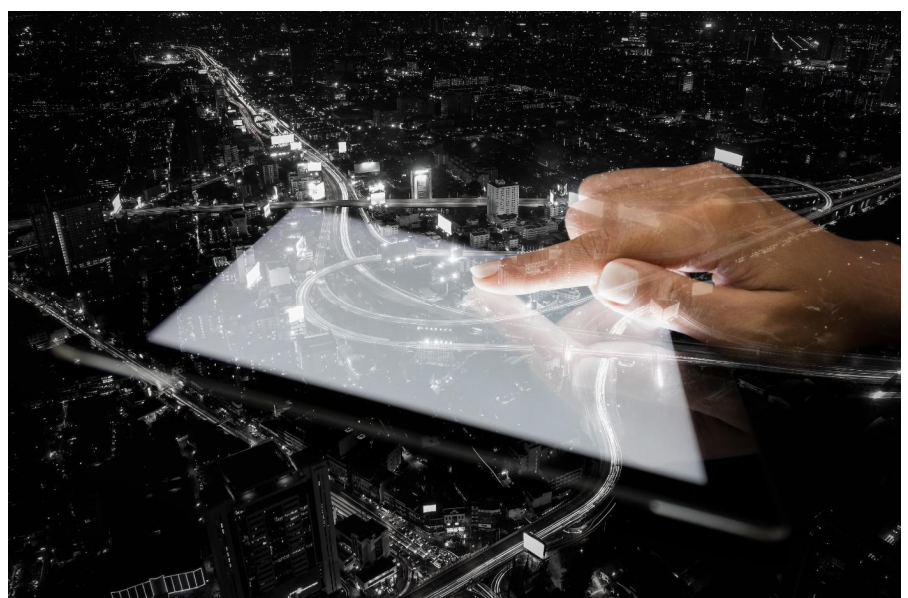
The lack of interest of traditional businesses for digital technologies often results from their lack of awareness on the concrete benefits and opportunities stemming from digital transformation.

For instance, in the French region Provence-Alpes-Côte-d'Azur less than one SME out of two had a website in 2011. According to a survey, the low proportion of SMEs with a website could be due to the lack of interest of regional SMEs for the creation of a website.²¹

Figure 6: Types of societies and most important assets



Source: Adapted from Rolf A. Jensen – DREAM Society (2001)¹⁹



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Key infrastructures and investments for digital launch pads

Urban centres and metropolitan areas are increasingly integrating cyber-physical technologies to optimise the use of resources and enable a higher quality of life. Innovative business models and digital technologies are transforming how services are delivered in cities and regions. The development of these new digital solutions has the ability to address the challenges brought by an increasing urban population. However, key investments and the existence of critical physical infrastructures are required to develop and successfully implement many of those capabilities.

The volatility and the rapid evolution of the digital world forces investors and policy makers to constantly adapt or create new enabling infrastructures addressing the most fundamental requirements of digital stakeholders (businesses, universities, accelerators, incubators...).

Though cost-effective and strategic, these high investments are not often judged as a priority by local policy-makers. Budgetary restrictions and the scarcity of public financing require greater selectivity towards the digital infrastructures of European local territories.

Innovative financial models are therefore critical to ensure the availability of the technological infrastructures needed for the transformation of the ecosystem.

European cities and regions are striving to invest in technological infrastructures to deliver value and to drive forward a favourable business environment.

Urban centres and metropolitan areas are increasingly integrating cyber-physical technologies to optimise the use of resources and to enable a higher quality of life however in peripheral and rural areas, investments in digital infrastructures remain often limited.

Large differences can therefore be observed between European localities. While in certain regions austerity measures and tight budget constraints are preventing investments in advanced technological infrastructures, in other territories investments in cutting-edge technologies are being considered as a key priority.

3 key success factors

- ✓ ❶ Ensure the availability of critical digital infrastructures for the digital transformation of local businesses
- ✓ ❷ Secure investments in digital infrastructures
- ✓ ❸ Ensure the economic sustainability of local investments in digital infrastructures

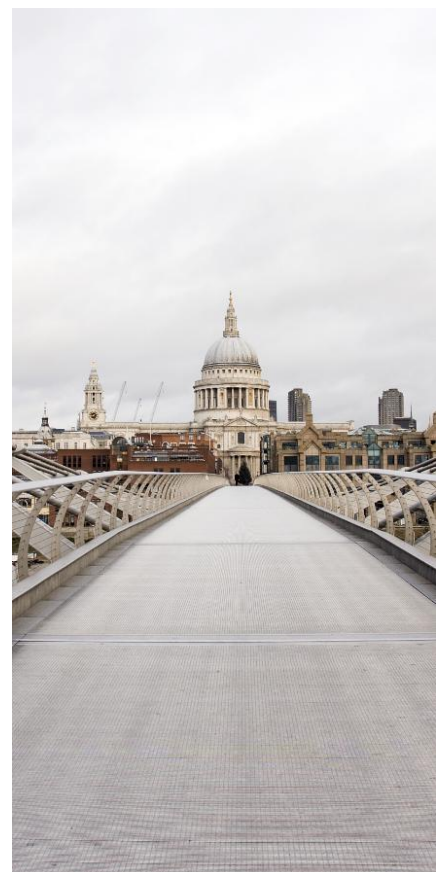
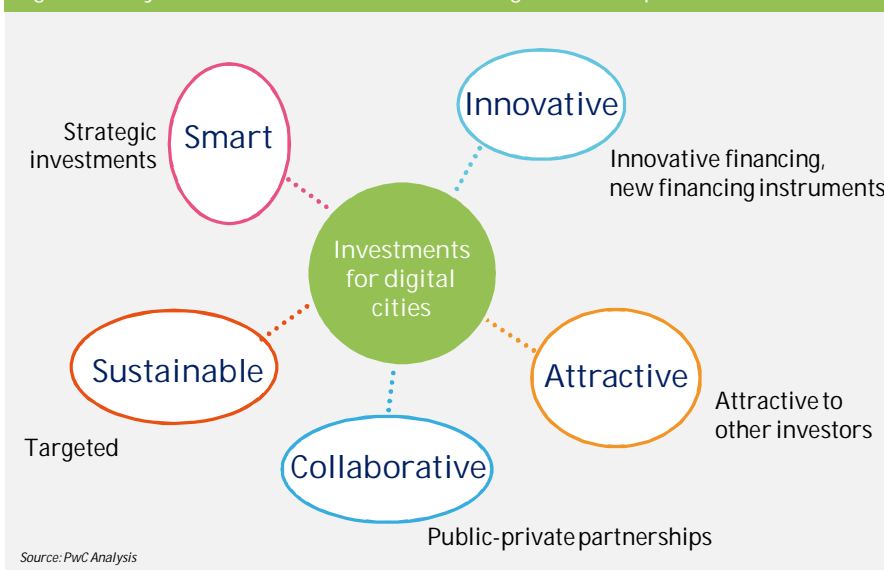


Figure 7: Key attributes of investments for digital launch pads



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11

Ensure the availability of critical digital infrastructures for the digital transformation of local businesses

Cities and regions have the ability to create the right framework conditions for an optimal digital environment by investing first in the required physical infrastructures (transport infrastructures, corporate offices, social infrastructures, etc.). Institutional infrastructures also have an important role in the digital transformation of traditional industries at city-level.

Developing a business-friendly ecosystem through investments in smart physical infrastructures

The creation of a business-friendly ecosystem is a precondition for the success of any digital transformation strategy. Cities can create the right framework conditions for an optimal business environment by investing in the required infrastructures (e.g. transport infrastructures, corporate offices, social infrastructures, etc.).

Physical infrastructures refers to the stock of cost-efficient and intelligent infrastructure such as urban mobility systems, energy, water supply systems, sewerage systems and solid waste management systems which are all integrated through technology. These technological infrastructures constitute tangible assets to attract tech companies and digital talents from all around the world. Moreover, the lack of integrated infrastructures can often lead to significant inefficiencies and risks likely to alter a city's economy. The largest investments and most successful initiatives at city-level often concern these physical infrastructures.

Espoo's investment strategy for infrastructure

The Espoo 2020 plan includes new investments of EUR 4-5 billion in the following infrastructures: extension of the metro lines, tunnel construction of a ring road, housing, office and business buildings, public services, university buildings, sports and cultural facilities.



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Installing sensors on infrastructures for smart and sustainable cities

Digital cities and regions both in Europe and outside Europe use digital technologies to enhance performance reduce costs, resource consumption and to engage more effectively with their citizens. The deployment of sensors on local infrastructures constitute the key enabler of these optimisations. For instance, smartPORT logistics (SPL) is one of the most innovative digital solutions of the port of Hamburg.

The SAP Connected Logistics based solution manages the traffic by interconnecting businesses, partners and customers of the port.

Ensuring the availability of shared development spaces for the digital inclusion of businesses

Strategic partnerships, avoiding vendor lock-in, systematic experimentation and availability of local innovation spaces are the main priorities in order to bring cities together and to create a global smart city market.

The digital inclusion of businesses (through online presence and social media use) is not enough to boost the competitiveness of EU manufacturing. A combination of inclusion and innovation (e.g. disruptive business models, digital manufacturing) is needed. For instance, Fab Labs are the makerspace for excellence offering digital (and analog) manufacturing to make a wide range of artefacts/services-processes.

Ensuring internet availability

Ensuring the availability of good broadband and high speed access can favour experimentation and is a key precondition for the digital transformation of local businesses. Over the past decades, European internet providers have been confronted with an exponential increase in the demand for bandwidth which looks set to continue.

First 5G city created in China

Today and future's most advanced technologies are heavily relying on fifth generation mobile networks and telecommunications standards (5G). This include technologies such as augmented reality, artificial intelligence, robotics and drones, self-driving cars, Internet of Things applications, big data analytics and cloud computing services.

In tomorrow's cities, eight main functional areas will be transformed by these technologies: residential area, education and research area, agricultural area, harbor area, government area, retail area, and cinema & leisure area.

For tomorrow's cities, it is thus crucial to ensure the integration of 5G networks and super fast broadband infrastructure. This is the rationale behind the first 5G city created in China. According to official figures from the Chinese Ministry of Finance, EUR 14 billion will be invested in the project, which is expected to be completed by 2020.²³

12

Secure investments in digital infrastructures

High upfront investments are not always required to finance digital infrastructures. Innovative financial and business models are increasingly emerging to fund local technological infrastructures.

Creating innovative financial and business models to invest in the needed infrastructures

High upfront investments are not always required to finance digital infrastructures. Innovative financial and business models are increasingly emerging to fund local technological infrastructures. The variety of existing financial schemes notably include joint ventures to Public Private Partnerships, Crowdfunding, Tax Incremental Financing (TIF) and green or energy revolving funds. Public authorities can take leadership to create incentives to encourage private investments in infrastructures for technology-based innovation in cities.

The US "Cities Innovation Technology Investment Initiative (CITII)"

In the US, the President's Council of Advisors on Science and Technology has recently recommended to create an interagency initiative, the Cities Innovation Technology Investment Initiative (CITII). It mainly aims at coordinating and learning from the work of the many agencies that focus on the development of cities all over the country. Ultimately, CITII will "encourage, coordinate, and support efforts to pioneer new models for technology-enhanced cities" based on a set of measurable goals.²⁴

Leveraging on the expertise of local energy saving companies

An increasing number of European technology-based firms are developing energy services in a non-profit or commercial purpose. These companies can offer a wide range of services such as energy audit schemes, energy saving project design and green energy supply. Local authorities should create collaborative partnerships with these local companies to discover new opportunities to tackle their local environmental challenges in a cost-effective and efficient way.

Unlocking investments for smart mobility

The benefits of local investments in digital infrastructures are evident when it comes to environmental sustainability issues. Digital technologies have the capacity to transform traditional public transportation system and to create more efficient and intelligent networks which can ultimately enhance the movement of vehicles, people, and goods. For instance, through the ELENA facility, the European Commission and the EIB have promoted an innovative bus fleet renewal programme in Barcelona. The three-year project includes the transformation of about 200 existing buses into hybrid buses for an estimated energy savings amount of 60 GWh.²⁵

Small-scale infrastructure thinking

As the World Economic Forum highlights in its report on the Top Ten Urban Innovations, cities will undergo their digital transformation thanks to large-infrastructure projects. Yet, small-scale infrastructure projects can also help to set the path. Small investments to encourage businesses to modernize their digital systems or to support the development of digital trainings for job seekers for example are likely to have a large payout.

Amsterdam's Sharing tower

The Sharing Tower accommodates businesses, but not only. It aims at creating an environment where people share their ideas and visions. In the Sharing Tower, design enables the sharing economy to become reality. Space is organized in such a way that every tenant and visitor have increased possibilities for sharing and cooperating.²⁶

Institutional infrastructures for digital transformation

Institutional infrastructures have also an important role in the digital transformation of traditional industries at city-level. Activities related to governance, planning and city management are re-shaped by ICT, which provides a new dimension making it citizen-centric, efficient, accountable and transparent. Crucial aspects of the digital transformation are city infrastructure, especially high-speed fibre access.

Cross-border collaboration to unleash investments in digital infrastructures

Cross-border cooperation can bring positive results, and this is true both for the public and the private sector. Thinking of the scalability of solutions implemented elsewhere and how they can be replicated is something cities and start-ups should consider, and this has been true in the case of Tallinn, particularly in its digital transformation path.

Cross-border collaboration between Tallinn and Helsinki

Tallinn is cooperating closely with the city of Helsinki and through this cooperation it has been able to achieve many successes, for example in the field of energy, transport and smart cities integrated solutions. This is demonstrated by the fact that travelling between the two regions is increasingly easy with a constant decrease in transport costs. Studies have demonstrated that the Uusimaa (Helsinki) and Harju (Tallinn) regions already form a largely integrated economic area, with strong synergies in various sectors, including ICT.

Overcoming the lack of investor confidence

Private investments are welcome and essential for the development of digital cities and regions but investors need to be ensured that they will get returns for their investment. The lack of private investments in physical infrastructures is often preventing European cities and regions from developing the key technological infrastructures required for the digital transformation of the territory.

New York Innovation venture fund

NYU's seed-stage venture capital fund invests exclusively in startups from current NYU students, faculty, and researchers.²⁷



13

Ensure the economic sustainability of local investments in digital infrastructures

The financing of local digital infrastructures is not merely about finding public investments; it is rather a question of economic sustainability. Local public authorities need to assess the extent to which digital infrastructures can become sustainable without continued public investments.

Rallying key digital stakeholders for the sustainability of local investments in digital infrastructures

The mobilisation of all layers of governments and financial institutions is critical to achieve these smart investments. Development agencies, Local banks and private investors, financial Institutions and NGOs, have to be mobilised to co- finance the creation of technological infrastructures.

A lot of European, national and local funds for regional development remain often little-known or unexploited. Local public authorities should leverage on them to finance their digital infrastructure needs.

New business models to support local economic sustainability

The rise of the sharing economy is highlighting the underutilization of resources within cities or regions. Many innovative business models are trying to tackle this issue by making sure the resources are fully exploited.

Apart from the famous Airbnb or Uber, other examples now exist. Peerby.com is a website and mobile app enabling consumers to borrow products by asking around in their neighborhood. Similarly, office sharing brings new revenues to companies which own or manage an office, and wish to rent out redundant office space as workstation.

Beyond underutilization of resources, new business models can also have a positive impact on the citizen's quality of life. This is the case of the circular economy, which provides opportunities to reuse, recycle and upcycle. Further, the example of car sharing illustrates how new services can reduce traffic and pollution, thus improving the livability of the city.

Hackathons in Espoo

The city of Espoo is launching several initiatives to accelerate the digital transformation of the city. 3D city model hackathons are for instance used to activate the local community and to enable Espoo residents to solve societal challenges. These week-end long hackathons are framing the regional and local challenges behind the need for innovation and therefore act as a key enabler for citizen engagement in the digital transformation process.

Digital investment to improve utility management

Investment in digital infrastructure can improve the management of utilities. Electricity, water, traffic are all subjected to severe peak use. It is estimated that 20% of capacity sits idle for much of the time to cope with demand peaks. Digital technologies along with innovative pricing structures can help limiting these peaks and thus improve the overall efficiency of the utility network.

The Łódź Special Economic Zone

In Poland, special economic zones are widely implemented as to attract investments and investors to Poland. Their objectives are to act as a catalyst for the economic development of cities or regions.

A special economic zone is defined as a separate, uninhabited part of the country's territory where business activity may be conducted under preferential conditions defined in the Act on Special Economic Zones of 20 October 1994.²⁸

To attract investors, tax allowance consisting in a corporate income tax exemption are offered. Investors running their business in an SEZ can also benefit from real estate tax exemption.

Today, The Lodz Special Economic Zone occupies an area of 1302 hectares. 50% of operating companies are SMEs. Large companies active in the zone include Fujitsu, Infosys, Dell, Gillette, P&G, ABB, Indesit, Whirlpool, Kellogg's.

An infrastructure development strategy strongly linked with the level of development of the city/region

The digital transformation or replacement of existing infrastructures require an in depth-analysis of citizen's needs and is highly dependent on the development stage of the territory.

Catching up cities and regions often consider technological infrastructures as secondary investments needs and usually favour investments in social infrastructures.



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About the Strategic Policy Forum on Digital Entrepreneurship

The Strategic Policy Forum on Digital Entrepreneurship was set up in 2014 to outline what should be the short and long-term strategy for digital entrepreneurship in Europe, to implement this strategy and advise the European Commission on key priorities. The objectives of the Strategic Policy Forum were to reinforce dialogue between industry, and the scientific and political communities, with the aim of shaping an ambitious EU vision and a European roadmap that will fuel digital entrepreneurship in Europe. The Forum advises the Commission on policy issues and actions to foster digital entrepreneurship and promotes the development of policy by EU countries at national and regional level.



The priority areas to be covered by the Forum's work, include:

- Identifying new business opportunities for jobs and growth: the focus is on how digital tools enable the development of new start-ups in all sectors of the economy, as well as the transformation and growth of existing companies (both SMEs and corporates), including social enterprises and organisations.
- Removing the barriers: the focus is on removing the most significant barriers, at all levels, spanning education, skills and entrepreneurial culture, technology, regulatory issues, taxation, access to finance, etc.
- Raising commitment and actions among the key stakeholders: this includes the public sector, as policy maker, as well as driver and enabler of digital entrepreneurship (e.g. through open government data, public procurement), private stakeholders and public-private partnerships, in support of EU Digital Entrepreneurship policy.

The members are appointed by the Commission, identified among key actors in the digital entrepreneurship field. The European Commission sought to achieve a balanced overall composition, based on broad representation and expertise of the members while keeping the size of the Strategic Policy Forum to a manageable level.

The following key organisations are represented:

- Industry representatives, including digital entrepreneurs, traditional industries (pioneers in the digital transformation of their business), technology service providers to digital entrepreneurs and relevant associations;

- Non-industry/Private organisations supporting and monitoring digital entrepreneurship, including NGOs, trade unions, universities, research organisations, intellectual property experts, equity firms, etc. and
- Public authorities, particularly active in the area of digital entrepreneurship.



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Web page of the Strategic Policy Forum on Digital Entrepreneurship

http://ec.europa.eu/growth/sectors/digital-economy/entrepreneurship/strategic-policy-forum/index_en.htm

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