



DIGITAL CITIES CHALLENGE

Assessment report for the city of Iași

***Iași, a growing digital powerhouse built on
skills and entrepreneurship***

July 2019



Digital Cities Challenge

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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.

This document has been developed in the framework of the field advisory services delivered in the city of Iași. It represents the main output of the first step of the digital transformation strategy: setting the digital vision and ambition for digital transformation. The assessment report has been developed by the Digital City team on the basis of:

- The results of the Self-Assessment Tool (SAT) and collection of Key Performance Indicators at the city level which took place between February 26th and May 15th 2018. A total of 41 valid replies was collected through the SAT.
- A literature review of key documents provided by the local leadership team (cf. Appendix II for full list of documents consulted).
- An assessment visit which took place from April 23th - 24th 2018.
- A vision and ambition workshop which took place on the 8th of May 2018.
- Regular catch ups of the core city team with representatives from the city (academia, business, public services) on a monthly basis and a strategy workshop that took place on 17th of September 2018 and two follow on debates on 22nd and 23rd of September.

This document represents the key input to the work performed during the subsequent 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



Iași County is an important regional player at the border between Romania and the Republic of Moldova. Iași ranks the 7th city in the country after gross domestic income, generating 3.06% of national GDP and 30.94% of regional GDP. It also ranks the second, after the capital city, as number of inhabitants.

The economic crisis of 2008 added to the deindustrialisation process the city went through affected the city and its smaller centres in the metropolitan area. The economic activities, compared to country's average have low value added, Iași contributing with just 1.47% to the country's exports, even though they doubled in 2007-2013. On the upside, in 2017 even though the total output of the industry was down by 6.1%, the total turnover of industry was up by 11,1%.¹ The main industries and industrial actors in the city are: services (ICT mainly and some banking), education (University Al.I.Cuza, Medicine and Pharmacy Grigore T. Popa University, Gheorghe Asachi Polytechnical University, Petre Andrei University), heavy machinery and construction (Build Corp, IAȘICON, CONEST), food (Compan, Kosarom, Bucium), pharmaceuticals (Antibiotice SA), metallurgy (Arcelor Mittal Tubular Products, Tehno Steel), textiles (IașiConf, IașiTex).

These businesses face pressures in terms of talent retention in the city, brain drain and skilled workers leaving the city for the capital Bucharest or other regional centres such as Cluj Napoca or abroad. This has been an increasing problem since 2007. Complex legislation that is ever changing is the second most cited problem, the businesses have few problems with the taxation levels, but with the clarity and stability of rules which they need to follow in order to function². Investment from private and public sources has been scarce, most decisions on

¹ <https://is.prefectura.mai.gov.ro/wp-content/uploads/sites/49/2018/07/RAPORT-IAȘI-2017-STARE-SOCIO-ECONOMICA-partea-1.pdf>

² <https://www.ziaruldelasi.ro/stiri/migrarea-fortei-de-munca-si-legislatia-stufoasa-principalele-probleme-in-afaceri--185874.html>

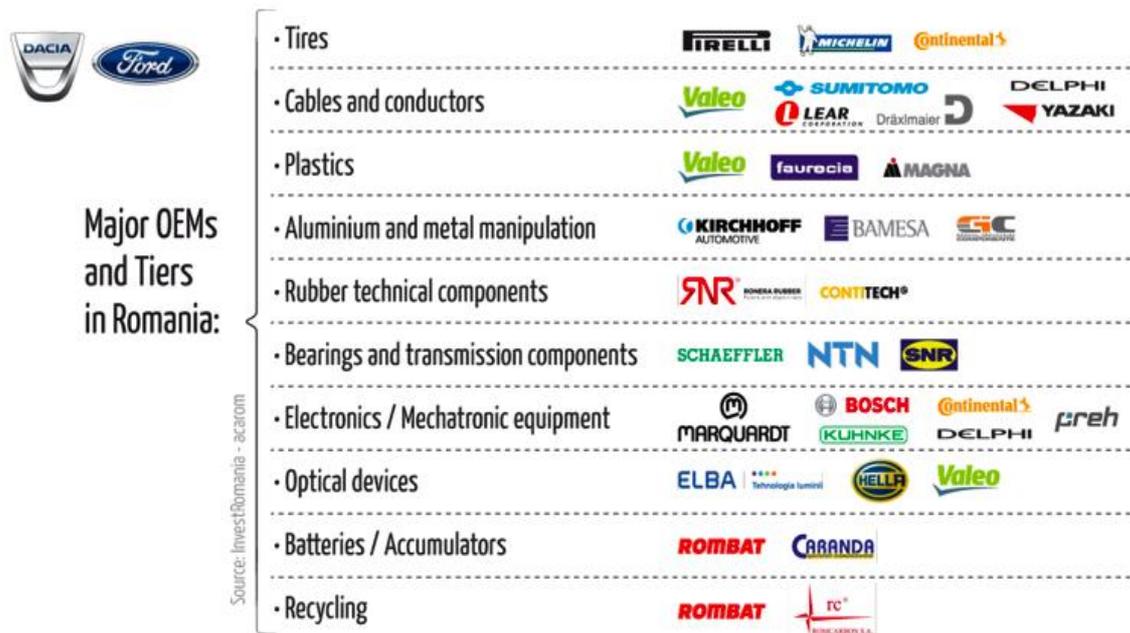
private financing by banks are taken in Bucharest and the regional funds are decided at regional not city level: this affects mostly businesses that require heavy capital investment. Entrepreneurial education at all levels is another demand coming from the business community.

We would like to focus here on two sectors who have their challenges but show potential of further growth: Automotive and ICT.

Iași is an emerging digital **Automotive Hub** in Europe. The Romanian Automotive market has been growing by 18% year-on-year average since 2009 and is forecasted to exceed EUR 20bn by 2020. It is the 4th biggest automotive manufacturer in the CEE.³ The biggest companies that are operating in Iași on digital for automotive are: Continental, Preh, Veoneer, Alten, Fortech, Arobs and Silicon Service and on the production side: Delphi, Lear, Autoliv.

Important players in the automotive and production sectors have been relying on teams of automotive companies operating in Iași.

Figure 1 Major OEMs and Tiers in Romania



³ ACAROM, Ministry of Finance, National Institute of Statistics & Invest Romania

Iași professional experience spans the complete manufacturing, sales and aftersales cycle. All the companies that are operating here are working on complex projects, some taking multiple years and enabling the local market to acquire strong business know-how. These companies get access to graduates and professionals rich experience in automotive and manufacturing projects, which spans a variety of technologies, solutions and processes.

Investments in innovation and R&D activities are major reasons for the success of the automotive players in Romania. In order to perform successful businesses and to manufacture competitive auto vehicles and components, the players in Romania focus their activities on innovation, safety, efficiency, quality, diversification of the product portfolio. Also, the players focus on establishing internal networks to link the knowledge of their employees in order to facilitate creative new ideas, innovations and best practice. One example of investment in R&D activities on Iași local market is the one made by Continental with 2000+ employees, EUR 38M invested in the past 10 years, the more recent announcements made by Preh and Autoliv who established their hardware and software centres here.

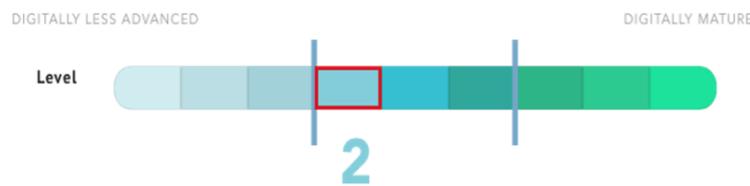
The Romanian **software and IT services industry** has confirmed its potential to become a real pillar to the local economy, generating four times higher added value per head than the country's economy's average and having a realistic potential to exceed EUR 4 billion (2.5% of the GDP) before 2020. ICT companies perceive Iași as a developing IT and services market. There are about 10,000 IT professionals in Iași, while the local universities release over 1000 IT graduates per year, Euronest ICT Cluster foresees as many as 33000 IT specialists by 2030 provided it can maintain its level of attractiveness for students in the city, region and from nearby Republic of Moldova. The market is made up of over 800 small businesses as well as the biggest players in the global software like Amazon, Oracle, Xerox, Continental, SCC, Pentalog and Centric being present in Iași. All these companies make substantial contributions to local and central budgets and have positive trickle down effects in the local economy. ICT has evolved in the area from basic outsourcing to full product development, but there is still more to do in order to create and retain IP in the city, this would require a more developed business to business market, an open testbed for business to consumers application development and better access to finance. In order to grow and retain the talent that fuels this industry, the salaries are rapidly pushed up and employers are looking to retrain graduates. City branding plays an important role in this space and there has been progress on this front, operational objective 6 is related to strengthening and creating an identity for the local talent who would value being associated with an ambitious city looking to become AI capital of the country.

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

The overall maturity score measured for city’s digital transformation has been rated as 4 out of the 9 progression levels by stakeholders (41 participants) who took part in the Self-Assessment survey with a majority of participants from industry.

Figure 2 Average score on the SAT



City	Education	Financial	Industry	Utilities
5	6	2	25	3

Source: DCC Self-assessment Tool

This result is mainly due to the gap between the abundance of digital skills available within the young population, the peaks of private initiatives and successes for the local IT industry and the lack of local financing, overall lack of public-private coordination and leadership and the suboptimal investment in other areas such as physical infrastructure.

Figure 3 Results per SAT dimensions

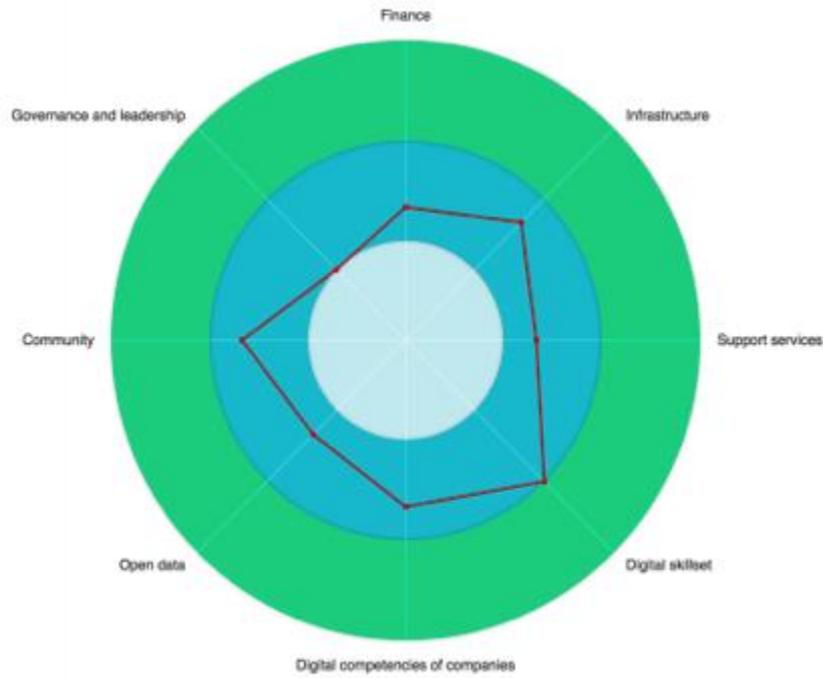
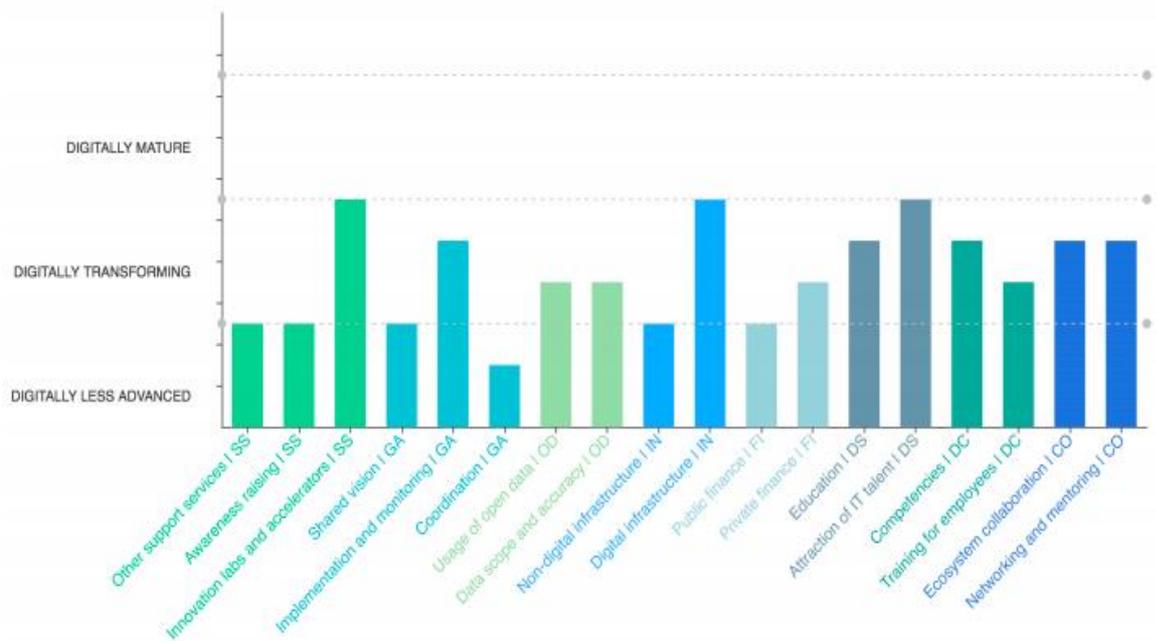


Figure 4 Results of the sub-dimensions



The main objective of this section is to characterise the strengths and weaknesses of the city and apply acquired knowledge in shaping a new digital transformation strategy for Iași.

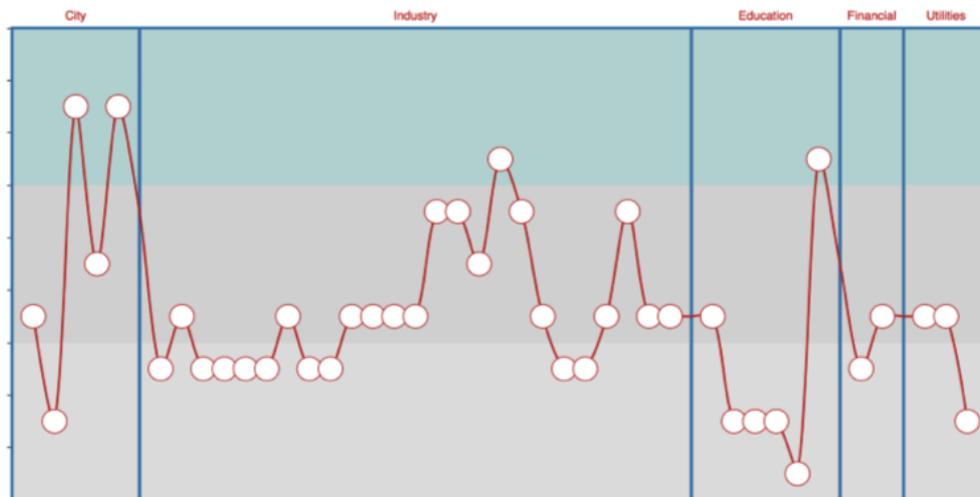
As Figure 3 “Digital Cities Challenge - results per dimension” shows the main strengths have been identified within: Digital skillset, Digital competencies of companies, Infrastructure and Community. High level of **Digital skills** are a result of the large volume of students who choose ICT (and related Engineering degrees), business and language degrees every year (which is true both for undergraduate and postgraduate studies - with over 5000 students/year between local Universities). Education level offered in the city has been highly rated by stakeholders as well as the attraction of IT talents (Figure 4 “Digital Cities Challenge - results per subdimension”). In turn highly qualified employees are a main condition to grow the **Digital competencies of companies** which are crucial to facilitate and accelerate the digital transformation. Competencies available on the labour market and training opportunities available to employees have been described as quite vast with a great potential to growth in the following years. A proper **Infrastructure** which guarantees a great connectivity is a good basis for further developments: Iași metropolitan area 75% household have access to Internet connectivity and a similar number is valid for businesses, this number goes up to 95% in the city area, 99% of territory has mobile coverage. Two thirds of the fibre infrastructure is accessible to public institutions for further connectivity deployments.

There is also a strong emerging tech **Community** willing to contribute in-kind and cash to the improvement of citizens’ lives, provided with the right data and the right space for collaboration they would produce applications to be used by local authorities or local services to benefit citizens in exchange for physical locations or other benefits of patronage of the various networking and mentoring activities. Stakeholders described local tech ecosystem as willing to collaborate with a huge potential for growth.

Areas where the city scores low: Governance and leadership, Finance and Supporting services. **Governance and leadership** is perceived as a weak point of digital transformation as the legislation which enables public private partnership is unclear and the norms of implementation are unclear. This lack of clarity generates a lot of nervousness for the local authorities to engage in partnerships with the private sector to solve challenges and create more opportunities for the local economy. What is more processes and authorisations for businesses are still complex because there is limited coordination between the central and local authorities in Romania and because a lot of systems are still paper based or require physical presence of the business owners. Limited coagulation over this collaboration makes for a limited local market for digital products combined with little awareness and sometimes

availability of financing resources make it difficult for local digital products to be created and implemented first in Iași and then elsewhere, this drives further the brain drain and disengagement with the city's life, this is why the objectives we propose are looking to help overcome this situation. **Finance** is perceived as another weakness. It has been indicated that the “risk taking appetite” of banks is quite low and most decisions of investment in the banks are not taken in Iași but in the capital city Bucharest. Most of the growth perceived by local authorities, also translated into the business rates paid, comes from the growth of the local ICT industry being part of the Outsourcing IT from global companies and the gradual movement of local providers of services from simple development tasks to becoming providers of value added services for these large companies. Whilst the ICT industry sees financing as a product of their own activity as a result of sales they make, for the traditional industry this is more of a mix. For the traditional businesses their potential of financing at the moment is even lower from the private sources and most of their attention is focused on financing ongoing operations rather than investing in digitalisation of their operations.

Figure 5 Answer points from Stakeholders



To sum up, there are peaks and a push towards excellency from the ICT business community and the education area and there needs to be more of a pull for service demand from the city itself to act as first a testbed and then a market for the digital products that can be produced locally. The city's role should be to coagulate interests and funnel investments in common digital and physical spaces of collaboration and raise awareness of city's values in order to stop the brain drain and grow the local economy.

3.2. Key Performance Indicators

The city stakeholders who participated in this exercise were very interested in starting to collect data from the initial KPI list provided by the Digital Cities Challenge team and have requested one of their thematic experts to help them establish the right methodology to collect and measure this data. From interviews and reported data the city enjoys great digital infrastructure and non-digital infrastructure (fibre network), digital skillset and education and has promising beginnings in community and support services area. The city is doing less well on governance and leadership, open data and finance.

For each of the four key themes emerged from the repositioning strategy for the city of Iași we have selected the relevant KPIs below, the list is quite extensive and we will consider in the next phase if it requires narrowing down.

Statement	ID	Description	Baseline	Targets
1. To design and execute the collaboration framework between the main driving forces (Education, Communities, Industry, Legal, Administration, and Citizen)	51	Availability of digital strategy [Y/N]	N	Y
	52	Availability of clear executive responsible for digital development plan [Y/N]	N	Y
	53	# of man hours of executive responsible on weekly basis dedicated to coordination of digital development plan [hours]	0	TBC
	54	Existence of a monitoring framework for the implementation of the city digital strategy [Y/N]	N	Y
	#	Number of Digital Champions active in each stakeholder signatories to Iași Digital MoU	0	50
	37	Number of ICT clusters and number of ICT companies joined as cluster member in any cluster organised/formed in the city	To be collected	
2. To go really digital on all possible fronts (i.e. Education, Communities, Industry, Legal, Administration, and Citizen)	18	Availability of open datasets [Y/N]	Y national, N local	Local datasets
	19	# of downloads of open datasets in last 12 months [#]	To be collected.	
	20	% of datasets offering real time information [%]	To be collected	
	21	Number of cases of digital companies using open data to develop a new service or to support their business operation[#]	To be collected	

Statement	ID	Description	Baseline	Targets
	22	Number of cases of non-digital companies using open data to develop a new service or to support their business operation[#]	To be collected	
	17	% of Individuals who used the internet for interaction with public authorities (average for the last three years)	To be collected	
	24	% of students in digital subjects over the last 5 years [%]	To be collected	
	25	% of ICT graduates employed in the city over the last 5 years	To be collected	
	34	# of mobile applications available in the city on smartphone (such as food delivery, peer-to-peer car sharing etc.)	To be collected	
3. To foster a regional entrepreneurship ecosystem underpinned by technology as key added value generator for local wealth and reason for others to invest in Iași.	38	# of digital start-ups	247	
	33	% of manufacturing companies offering digital services (e.g., company offering remote maintenance)	To be collected	
	40	Grants / tax incentives provided at city level to support digital start-ups in last 12 months [EUR]	To be collected	
	41	# of digital start-ups which received grants / tax incentives at city level in last 12 months [#]	To be collected	
	42	Grants / tax incentives provided at city level to support non-digital companies for digital projects in last 12 months [EUR]	To be collected	
	43	# of non-digital companies which received grants / tax incentives for digital projects at city level in last 12 months [#]	To be collected	
	44	Number of digital start-ups receiving a loan in last 12 months [#]	To be collected	
	45	Number of digital start-ups received venture capital in last 12 months	To be collected	
	46	Availability of business angels for digital start-ups [Y/N]	Y - 1 initiative	

Statement	ID	Description	Baseline	Targets
	47	# of innovations labs / accelerators [#]	8	16
	48	# of start-ups / companies attached to innovation labs / accelerators [#]	To be collected	
	49	Number of participants in awareness raising events organised in the area of digital transformation/Industry 4.0 etc. [#]	To be collected	
	50	# of support services (other than financial) available for supporting digital transformation in the economy	To be collected	
4. To highlight the values of Iași and the reasons to stay and to join in	#	The balance of residence change	2582	To remain positive & improve TBC
	30	% of vacancies for digital jobs not filled in 6 months		
	#	Indices of visibility (both form the inside & outside) - brand recognition - Iași AI capital		

4. The local digital ecosystem: leadership and governance

Leadership and governance were two of the dimensions the city scored lowest on the SAT and this came through both during the assessment visit and at the Vision and Ambition workshop. However, at strategy stage the ecosystem players were already coagulating around the idea of a digital plan for the city and were keen to contribute and endorse the results.

The city has a series of strategic documents: The Regional Strategy for North East 2014 - 2015, Iași Cyber City Concept Note and the Urban Development Strategy 2015 - 2030 for Iași, which take into consideration the digital area, however none of them place it as part of the fabric for economic success. Most of these documents were drafted with little consultation of the digital tech community.

All of the interviewees outside the public administration or the regional transport operator were unaware of local priorities related to digital transformation. At the moment there are no specific overall digital key performance indicators the city is measuring against, some are part of the regional strategy in terms of employment, connectivity coverage, talent creation and retention. It is notable that one of the three main objectives of the city development plans reads: *Iași will have a knowledge based industry focused on ICT and related services. This will be enabled by: i. a massive educational programme in Internet and e-Business skills for entrepreneurs and population at large, ii. broadband roll out and access for all population.*

The city authorities did not feel they should act as leaders of the digital community, but as enablers and they have recently started to engage more with industry and with community led organisations in the city. There is a lack of trust and questioning of legitimacy on both sides. The public authorities are perceived by most digital community as backward and not knowledgeable about the domain and the city authorities themselves feel they cannot act in all domains and digital development has traditionally been associated with a rich ICT industry who does not need public intervention.

The unclear legislative framework also scares off the public authorities to create more collaborations. On the private sector and other non-governmental organisations there is a lack of trust in the decisiveness and speed of action displayed so far by public authorities, not necessarily linked to the local one but more generally governmental bodies.

To summarise, the main strengths of the local digital ecosystem in terms of leadership and governance are:

- Public authorities have led in ensuring the city has good digital infrastructure (i.e. for IoT (wi-fi, LoRa, Dark Fiber) and fiber optics).
- There are natural leaders in both academic and business world that have grown the market and gave support and feedback to the local authorities.
- There have been more awareness raising events on digital and bottom up approaches in the decision making process at city level.

Whilst the main weaknesses are:

- A low level of consultation of citizens and businesses.
- The absence of a common vision and framework of work, with clear responsible parties for the different areas of development.
- Unclear legislation and understanding of forming public private partnerships to leverage public assets, create and deliver products and services.

Since the start of the Digital Cities Challenge there has been movement in a positive direction with the Town Hall signing a Memorandum of Understanding with the Open AI community in Iași and with several participants from the consultations voicing their willingness to participate and actively contribute to the digital strategy for the city. There has also been recent movements to appoint a function which would be in charge of digital development at the Town hall. We believe objective 1 through establishing a Memorandum of collaboration and a platform for sharing data as well as a network of Digital Champions, will contribute to advance collaboration between the different stakeholders in the city and build it on a very concrete basis for the digital community.

5. The use of digital solutions by local companies

Even though the city boasts a rich set of software skills and businesses, most of these are not delivering for the local industry nor for the local administration. For the local administration, some of the respondents signalled availability to build applications even for free only to see them deployed and implemented in the city, the public administration is now considering the legal framework in which this could work.

The traditional industries who could benefit from the digital technologies have challenges in terms of investments for digital upgrades and they find it difficult to assess the impact of the usage of such technologies considering the labour costs are still relatively low compared to software graded enterprise. Progress has been done in wealthy business such as banks (although they're usually well-equipped from the headquarters), private healthcare institutions (Arcadia Hospital, Regina Maria, smaller labs & clinics), retailers (Dedeman) and others; also the events industry heavily uses digital in planning, organising and promo; small businesses use Office suites, accounting solutions (such as WinMentor which is built Iași and has the predominant market share in Romania), invoicing (such as <https://www.smartbill.ro/>), or CRM (<https://www.minicrm.ro>) - so usually mainstream and small scale solutions.

The industries that have taken advantage of advanced digital solutions have foreign capital and they do not represent the norm (for example automotive companies such as Delphi Diesel Systems which acquired solutions provided by software companies from Iași).

The first wave was marked by the emergence of creative industries. The city of Iași has been included in a network of creative cities in Southeast Europe, with Plovdiv, Split, Novi Sad, Belgrade, Tuzla, Pristina, Skopje and Tirana, cities where various development and support projects have been launched of local and regional creative industries. Local entrepreneurs understand that value can also be gained by developing intellectual property and by investing in services based on creativity and communication. Thus, Grapefruit, a prestigious provider of branding and design services in the field of interactive media, or the IT company "Radix", have come to distribute software solutions and computer components worldwide, being finally bought by Ness Technology. Events such as "Fashion Week in Iași" which is one of the most important fashion events in Romania and the "Cucuteni-5000" traditional ceramic fair that

gathers ceramics creators from all over Romania, became events with tradition for the city area.

Local digital marketing companies exist and are very good, but they mainly work for large corporations with foreign capital e.g. Dacia - Renault, TiVo and many others; they rarely serve the local market. The business case for digital to be used to increase volume of sales, beyond SEO and basic social media, is very hard to visualise for all companies in Europe, but in Iași they are far from the European average. A few companies that stand out in the digital marketing area: **Namogo** (<https://www.namogo.com/>), **Grapefruit** (<http://www.grapefruit.ro/>) is a good example, **Beaglecat** (<http://www.beaglecat.com/>), **Subsign** (<https://subsign.co/>), **Wink** (<http://www.wink.ro>) (outdoor, transport, retail), **Webmagnat** (<https://www.webmagnat.ro/>), **Adservio** (e-Education baby steps - example <https://www.adservio.ro/>)

To prove the local capacity & skills able to create world wide successful high-tech products and businesses, worth it mentioning companies such as BitDefender, UiPath, eMag, Gemini Cad Solutions, CognitiveSEO, Brand Mentions. However, the number is limited and their market is predominantly global and less local (same as for digital marketing services above).

One of the notable initiatives that manages to get closer traditional industries and IT is Connect Nord-Est, which has excellent engagement results.

To conclude, although Iași has all the necessary skilled talent who could contribute to any sort of digital product/service/initiative, there's practically a still immature local market where the digital needs of the industries/traditional business could meet the services provided by the IT businesses - reasons being around missing education, culture and funding. There is, a risk with, the competition of countries with a low level of labour remuneration, but also the risk that the service sector gets much more than what it really should be. Businesses have understood the importance of online promotion to have access in new markets, computer-aided.

In order to overcome this challenge, solutions along the following lines are to be considered:

- Educate businesses to make it crystal clear that investments in IT / Digital would cut costs, boost efficiency etc.
- Help businesses access public investment (Romanian funds, EU funds etc); there's is still an acute lack of competency in the EU funds consultancy space, fact proved by the low absorption of this kind of funding.

- Help local businesses by offering tax reductions or other fiscal and/or administrative advantages as incentives to re-invest profit into digital.
- Educate administration and other important institutions and make a decisive leap in going all-in digital.

6. Community engaged in digital transformation

Iași is recognised as an important IT centre in Romania, with over 17 thousands IT specialists, in line with other cities such as Bucharest, Cluj, Timisoara, Sibiu, Brasov, Craiova. There's a strong presence of IT companies developing their first class digital products or delivering end-to-end IT services for world-class global organisations; just to name a few of the IT companies, headcount ranging from 2000 to hundreds: Amazon, Continental, GoDaddy, TiVo, Romsoft, GeminiCad Systems, Ness, Centric, Conduent, Endava, Optymyze, BitDefender, eMag, 3Pillar Global, CGM Health, CRF Health, Veoneer, Preh and many others (a more comprehensive list here <https://codecamp.ro/partners>).

Progress has been achieved even without setting out a clear goal, as a result of highly talented tech-people living & working in the area. For example, "out of nowhere", dozens of entities, ranging from formal & well-organised to less formal, sprang and added their contribution in Iași (even if sometimes with national focus):

- Technical communities, such as [Codecamp Romania](#), Google communities, Microsoft communities, Amazon communities, [IAȘI AI](#), etc. (list available [here](#)).
- Coworking & maker-spaces and innovation hubs, such as Hackerspace, The Grape, Rubik Hub, [Fab Lab Iași](#), Teatru Fix, Hubrica, Resilience Hub, Meru etc), innovation initiatives (hackathons, makeathons, Innovation Labs, civic transformation groups), a printed and electronic magazine for the regional ITO regional industry (PINMagazine).
- [TBNR](#) tech start-up accelerator, 100% privately funded; invested in 3 start-ups in 2018 and continuously scouting (see the forthcoming [Startup Spinner](#)).
- Enterprise driven innovation activities such as Orange Fab, Continental Innovation Days, KPMG GrowPad, Endava Techflow, Amazon TechOn etc.
- NGOs, out of which Civica is driving initiatives for Iași to be an open city, governed by transparent institutions which decide in collaboration with its citizens; their mission is to increase the power citizens in the decision making process that affects their lives and encourage active participation to public life and public projects. <http://asociatiacivica.ro/>.

- PIN Forum & Gala Awards, starting from 2016, an initiative from the editors of PINmagazine for the entire regional IT & Outsourcing Industry.

The largest IT community is Codecamp Romania, started in 2008, whose purpose, by design, was to stimulate and help the other groups of people find their identity and purpose and grow their own based on their specific interest. Codecamp is now doing conferences with more than 1500 or more participants, each edition, twice a year. Given the increasing interest for the Artificial Intelligence field and the strategic plan to grow a strong, regional capability, the community started another initiative: <http://ndrconf.ai>. Codecamp has strong partnership with almost all the technical & digital events and communities all over the country and outside the country (just to mention Romanian IT, If When Then and list could continue). Other annual events currently existing in Iași and supported by Codecamp include <http://www.startupspinner.com/>, <http://devexperience.ro/>, <http://techshift.ro/>. In addition, almost every day of the week one can attend smaller technology related events/meetups, that focus on knowledge sharing amongst professionals.

One of the initiatives that managed to get closer IT and other industries is Connect Nord-Est, which has excellent engagement results. Challenged by the communication factors among business and technology, the initiative could do with a bit more focus on educating the businesses to make strategic investment decisions in technology.

Along the same lines, the Civic Heroes project is bringing together people with digital skills who volunteer to implement solutions for organisations (mainly NGOs) which do not have the expertise and/or the funding needed to create digital support and automation for their activities.

The technical faculties, student organisations (AIESEC, BEST), the informal schools (such as Scoala Informala, Wantsome), the training & consultancy companies (Strongbytes, Introspecials, Edurom etc.) represent an important foundation for the entire entrepreneurship life of the region.

One of the relatively weak point is the absence of relevant clusters in the city. They could contribute a lot by having a good potential to attract funding, share resources (knowledge, network, services, talent etc), influence legal/administrative decisions, and so on. While still facing challenges related to better collaboration and mobilisation of energies to get best synergies, the digital community in Iași is growing strong and it gets increasing relevance for the local businesses.

Digital companies, universities, IT community in Iași are increasingly offering their services to non-digitised institutions, offering pilot projects in the first place, in order to present them the benefits of their use, and then to expand the whole system.

- Orange has implemented a pilot wi-fi project on 10 buses in Iași (to increase connectivity), this demonstrated the value for the city. Currently, there is a contract for the implementation of wi-fi systems across the entire public transport fleet.
- uRADMonitor (<https://www.uradmonitor.com/smartcity-debate-iasi-2018/>) has implemented a pilot project on 10 buses that consisted of installing IOT devices equipped with environmental monitoring sensors that generated uniform and comparable environmental data so we can gain an understanding the overall picture of pollution for the city.
- Andan Electron has implemented a pilot project for ticketing to manage the flow of people who need to access public services. Currently it has implemented such systems within the Iași City Hall, Iași County Employment Agency, Iași Personnel Records and a private partner, Iulius Mall.
- Orange and Vodafone have implemented pilot Wi-Fi Internet delivery projects in the central area of the city.
- The Community of Artificial Intelligence in Iași, after our meeting, created the Iași Smart City site, where the achievements are presented and the project proposals from the citizens will be collected once it goes publicly live.

More opportunities for the community to get involved into the life and the business of the city, more support in the consolidation of the entrepreneurial ecosystem (education, hubs, investment structures, start-up accelerators), an educated, open and less bureaucratic administration system are key for success and need to be considered a priority.

7. The state of local digital and physical infrastructure

According to Ookla, Romania has a medium speed of download of 61,8 Mbps for fixed connections and 18 Mbps for mobile connections, coming number 5 in the world. Iași classes second after Bucharest in terms of fixed connection speed with 76,1 Mbps and mobile downlink of 15,6 Mbps. The Metropolitan area has optic fibre up to 75% of the territory and the city area up to 95%, with 99.5% mobile coverage for mobile in the territory. This offers a good basis for development and expansion of digital services.

In terms of public Wi-Fi there are not many covered areas. The interviews showed there was not much demand from locals for free Wi-Fi, but for business travellers and tourists the surveys show that more public hotspots would be useful. Upon experience exchanges the city authorities learned that businesses, hospitals, schools and other users would appreciate if the Wi-Fi was indeed used to collect data that would help the landscaping of the city and that the data be made visually available to users (air quality statistics, areas where there is more crowding at certain times of the day/week/major events, installation of benches depending on age groups and conception of leisure areas depending on current usage and patterns).

The SAT results show that the local community believes digital infrastructure is one of the strengths of the city when it comes to the wireless connections, access to 3G/4G networks. In terms of e-government services, the city provides the options for citizens to pay taxes online and publishes information on the internet, however, there seems to be low perception, awareness and usage of these services.

A major point for improvement relates to the integration of digital elements into public transport, the healthcare system, by utility managers or facility managers is low. This is one of the missing links into the mainstreaming of digitalisation in the city. Future projects need to infuse such crucial urban public services with innovation. A potential low-cost solution to improve these aspects is to develop “innovation / digitalisation challenges”, where a group of digital leaders in the city (who have already worked in this digital strategy) mobilise the leaders of the public transport system or the health sector to define concrete challenges, which can then be started to be solved through hackathons and / or prizes to the best digital development team.

The main concern expressed by the different stakeholders is cybersecurity. Particularly, it is important to highlight the following points:

- There is nervousness in collecting, managing and offering secure access to datasets that would be collected as the city gets more censored up.
- At the workshops there were discussions of experimentation developing in a platform supported by engagement programmes where the data would be accessible on a central server and be anonymised seemed like a good option.
- As to and when data platforms will be built and made available they need to consider privacy and security by design.

8. Digital solutions enabling the modernisation of business environment

The public authorities are open to embracing the digital paradigm. Still, they seem a bit shy in this respect, with incremental but a-bit-too-tiny steps made towards digitalisation, fragmented views and without inhouse expertise and resources to adopt the digital at the heart of their operations. One of the main challenges is lack of finance and the ability to attract it both from public and private sources. Therefore, the objectives formulated as a result of the DCC initiative, aim to support this area by enabling first a framework of collaboration, encouraging a marketplace of applications that would have local consumers (both business and citizens).

Citizens and also businesses have the right to communicate and interact electronically with authorities / administration in a convenient, simple and accessible way. According to Smart Cities Council, a city isn't smart because it uses technology but a city is smart because it uses technology to make its citizens' lives better. Iași City approved and implements its Development Strategy for the 2015-2030 period. Its vision is to “*modernise and improve public services using the new technologies, turning Iași into one smart city of success.*”

Digital technologies and digitisation is expected to provide a basis for up-to-date, efficient and user-friendly public services. Also, modern ICT solutions and services will encourage participation in political discussion and decision-making processes. By including new methods, the quality of administrative action and of political decisions can and should be improved and their legitimacy strengthened. This should also lead to an increase in the transparency of governance.

Open public data is therefore a central issue here, with the local administration making non-personal data available to the general public in open formats (see next Section for further detail). Individuals, NGOs, enterprises, scientists and other authorities can freely use and link the data – to program apps and software, for example. This also has an added democratic value since it enables discussions to be held at a more factual and objective level.

Implemented projects and future initiatives include the following:

- Applied within the framework of the Regional Operational Programme 2007-2013, Priority Axis 1 "Supporting the sustainable development of cities - urban poles for growth", Field of intervention 1.1, "Integrated urban development plans", Sub-domain: Growth poles. As a result, the project "Traffic Management System in Iași Municipality" was implemented.
- Completed the design of "Integrated Video Surveillance System to Increase Social Security and Crime Prevention in Public Spaces of Iași City". The design required the installation of about 950 video cameras in play lands, schools, parks and other urban agglomerations.
- In the process of implementing there is Iași Velo City project - the bike-sharing system, a component of the Smart Mobility segment and the development of carbon transport "0". Velo stations will be located in public transport nodes to develop intermodal transport and increase mobility.
- The buses are Euro 6, equipped with disabled platforms, passenger information screens, counting of the number of passengers. On 10 buses, a pilot project was implemented, providing free wi-fi (Smart Connectivity) and air quality meters.
- On the e-Services component: e-TAX - the information and on-line payment system for local taxes and fees, ghiseul.ro - local taxes and fees can be paid to the City Hall of IAȘI and taxes, taxes, excise duties, contributions to the National Agency for Fiscal Administration - ANAF, supply of online urban planning certificates, online bookkeeping of people, online civil union ceremony programming, online transcription programming, retrieval, citizenship, online payment of civil status taxes and people's records, telephone programming for medical services or outpatient consultation integrated with the specialised clinic "Dr. C. I. Parhon", online obtaining of laboratory analyses at IAȘI Clinical Recovery Hospital, obtaining medical letters online at the Iași Clinical Recovery Hospital, online enrolment at the Clinical Recovery Hospital in Iași, buy online tickets at events organised at the Athenaeum in IAȘI, online paid services for Termo Service Iași.
- E-Administration component: own channel on YouTube - live online broadcasting of Local Council meetings and press conferences, requests, standard forms and templates that can be downloaded online, checking the online application status.

Most of these initiatives are too recent to draw significant conclusions on their impact. The only application which already shows results is the traffic management system implemented by Iași municipality. From the interim evaluations there is reduction in the delay for crossing the analysed network (expressed in seconds / vehicle) by at least 21%, given that the number of vehicles increased by 6%.

Also, after the introduction of the e-pay system in public transport, the volume of tickets and subscriptions increased by 18%.

Indicators to be monitored after implementation of other projects which are in the pipeline :

- The number of passengers using public transport (an increase is expected after the implementation of e-ticketing systems, the purchase of electric and CNG buses and trams);
- Invoice value for public lighting (expect a decrease after the implementation of smart lighting - LED lighting and telegraphy systems);
- Number of on-line services and related to that;
- The number of accesses to online services;
- User satisfaction.

In addition, public authorities also plan to launch the following initiatives in the next three years:

- Integrated Video Surveillance System for Increasing Social Security and Prevention of Crime in Public Spaces of Iași Mountains, whose design is completed.
- Smart Parking - a system for parking management and announcing the participants in the traffic where free parking is in Iași. Also, interested citizens can have the possibility to reserve their parking space.
- Smart Energy - an efficient lighting system with sensors to detect people on the street and illuminate just the passing way.
- Smart Garbage - a smart garbage collection system. Intelligent Pubs to announce dispatcher when full, navigation system to show the optimal route for collecting all bins, for minimum fuel consumption, depending on traffic.
- Smart Healthcare - telemedicine system. Online schedules, online results analysis, online prescription and online prescription, allergy alerts map, e-recipe with online payment, and automatic home delivery.

The City Town Hall in collaboration with Open AI community are working towards the live launch of a website (<http://smartcity.idealweb.ro/>) that raises awareness of the current available services online and asks for feedback on these upcoming plans as well as further suggestions from city stakeholders on what should be developed first.

9. Data-driven innovation

Relevant and accessible data is the most important asset most of the organisations in the world value nowadays. To foster overall economic growth and individual businesses growth, the city of Iași needs to commit to creating the context and to massively contribute for making this vital asset available for the businesses and the citizens. Data is the foundation on top of which value can be generated in the form of service & product marketplaces which link demand and supply. Just to name some of the most important areas where relevant, up-to-date and quality data are of major interest for the businesses and citizens:

- Existing businesses and their services, NGOs, other groups and entities.
- Public sector (fiscal, administrative, transport, quality of life, population/demographics, other resources that exist locally).
- Healthcare.
- Education.
- Infrastructure, real estate (office, living, industrial), culture, tourism, travel, accommodation etc.
- Research results in universities, research centres, private sector.

The central and local public authorities are in the early stages of embracing the “digital paradigm”. There are elements of e-services such as: e-TAX information and online payment system for local taxes and fees, <https://www.ghiseul.ro/> contributions to the National Agency for Fiscal Administration (ANAF), supply of online urban planning certificates (although many respondents from industry indicated they would like a faster process for planning certificates or at least an online tracker of where their demand is within the system/decision making process).

Citizen’s online services have advanced and at least all the forms related to living, health checks and doctor appointments, travelling and studying are available for download online and sometimes processing online, and this increases the attractiveness of the city for young generations. Observations by respondents were made about the necessity to make all the requests paper based in order to get a digital ID and the lack of acceptance of e-signatures for all forms.

In terms of data for innovation, there are a few datasets made available from <http://data.gov.ro/> and <http://www.insse.ro/> but observations were made at the Workshop about the limited regional set availability and no real time update. There was a demand coming from many industry stakeholders to build a platform where business data is made available in real time to encourage investments.

Other suggestions from the workshop and anecdotal information from the community:

- Improving infrastructure management & traffic management; Information on traffic, parking spaces public, transport and pollution; Enabling mobile apps for all the above; Extending the transport network, GIS predictability and location of buses; Bike sharing and car sharing app; E-health records attached to the individual fully portable and accessible from any health provider.
- Platform presenting medical services available; Online booking; online results; online payments; easily accessible online patient file.
- Platform with all the formal and informal education offering available; Matchmaking of offer with beneficiaries (including individual trainers); Online CVs and personal portfolio connected to the job market.

The preconditions for fostering innovation activities through the use of open data are already here: a lot of digital knowledge around, appetite for creating businesses, and appetite for contributing a better life in Iași even by volunteering are already in place. The challenge is the lack of data. Hence, the investment in making the open data strategy first a class citizen in the overall digital strategy of the city is imperative, and has been addressed with priority in our set of mission statements and operational objectives.

10. Skills and entrepreneurial culture

Iași is one of the top IT centres in Romania, with more than 20.000 professionals working in the ICT industry. The digital skills of the people were acquired as a combination of formal higher education, informal education provided by communities (meetups, workshops, conferences), professional training provided by world recognised training providers and hands-on/projects in local and global companies (Amazon, Continental etc, full list [here](#)).

The predominant pool of talent and skills are developed locally in the city, but at the same time, Iași, in its position as a capital of the region, is attracting from all the other smaller cities around; moreover, in the past 5 years a considerable number of highly educated people from the surrounding countries (mainly Moldova and part of Ukraine, which were not many years ago Romanian territories), other important IT centres of Romania, and even from other countries of the world (both diaspora and foreigners) are relocating to Iași.

The main profiles which are in high demand are:

- IT roles involved in creating of end to end hardware & software solutions: developers, testers, project managers, business analysts, UX designers; the demand mainly comes from the IT companies (software houses, either product or services), followed by banking, healthcare, and smaller other business which invest in digital.
- Mechanical, electrical and other types of engineers for the automotive sector.
- Foreign languages speakers for the outsourcing sector (BPO, support of all kinds etc).
- Marketing & sales.

There is a high pressure on the labour market, with an increasing imbalance between demand and available workforce.

The companies are present with offerings from early days in the professionals' career, from the first years in university and even high school (which is sometimes perceived as an issue by the universities, as the talent is tempted to skip higher education altogether - not a real problem right now, but that's a global phenomenon that will probably become more and more real in this region). IT companies are a very attractive employer as they offer very good compensation packages, which include modern working environments, salaries ranging from 500 to 5000 euro after tax, depending on skills and experience, insurances and other benefits.

The local companies have a great opportunity to sit next to the existing talent pool with high class education and worldwide recognised experience in IT / digital, a fact that is currently still underutilised, due to some cultural and education limitations on one hand, and the lack of investment in high-cost services on the other. All businesses experience difficulties in attracting local IT talents as there's a quite high competition and a limited pool of candidates, but, of all, the local non-IT businesses have hard times competing with the multinationals on salaries, visibility/marketing, attractive projects. This becomes even harder to tech and non-tech start-ups, as in addition to the aforementioned there's the uncertainty and job security element specific to this type of endeavour.

Lately, there's an increasing appetite, coming especially from the younger people, for tech start-ups. The driving force in this space is the community itself: <http://tbnr.ac/>, <http://lasistartups.com/>, <https://codecamp.ro/>, <https://rubikhub.ro/>, with little (if at all) support from the Administration - the only exception being made the Regional Development Agency for North-East of Romania and the Start-up Nation Governmental Programme (which exists, but its design is not the best support for start-ups). In terms of fostering the cultural aspect regarding the entrepreneurship we have high expectations from the partnership started in 2017 between TNBR (the tech startup accelerator), RubikHub (through its RubikEdu program) and high schools and universities from the region, and we're expecting gradual changes. [more information on the communities involved in the digital entrepreneurial transformation can be found in Chapter 8].

Digital entrepreneurship is undoubtedly one of the key areas to develop in the city, with involvement and support from all relevant stakeholders. Iași has a richness of talent coming out of higher education in STEM, business and social sciences subjects, these are quickly absorbed in the local market, but a significant number are still leaving the city for the capital or moving abroad. There has been a rise in start up creation and more entrepreneurial outlets of support exist now that offer a different route to development, but building more in this sense: through education, through more incubation and acceleration spaces and programmes, through offering the city space and data as a testbed for these ideas, through public funding schemes that encourage investment in digital in the traditional industries, through attracting more private investment to grow and retain the IP in the city.

11. Digital transformation SWOT analysis

	Strengths	Weaknesses
 Infrastructure	<ul style="list-style-type: none"> • Optic fiber ~ 70% owned by city, 25% private • Relatively low internet/data costs • 99.9% mobile coverage between 3 providers 	<ul style="list-style-type: none"> • Physical infrastructure is poor and lacks vision future built environment and protected plas • Electricity costs are high due to monopoly • Lack of collaboration between public & private sector.
 Access to data	<ul style="list-style-type: none"> • INSSE national & regional statistics (could be improved) • Data.gov.ro • GDPR like legislation early on 	<ul style="list-style-type: none"> • Few metadata sets & sometimes at cost • Data sets are not updated in real time • No common data platform for sharing • Non standard format used. Still pdf and doc formats present.
 Digital skillset	<ul style="list-style-type: none"> • Good mix of skills available (IT, languages, business) • Started programmes for IT aimed at different age groups • Business community closer to universities 	<ul style="list-style-type: none"> • Limited capacity to deliver more graduates • Lack of excellency in research is limiting the level & upskilling potential • Curricula can be outdated
 Companies' digital competencies	<ul style="list-style-type: none"> • Better retention of human capital in the city • Automation & robotics in some of large companies • Skills in the IT outsourcing companies 	<ul style="list-style-type: none"> • Outside ICT companies, digital skills are low other industries • ICT rarely used for industrial automation of processes • Cost for local industries is high • Low wages drives low investment in digital
 Community	<ul style="list-style-type: none"> • Active emerging tech community w events • More professional bodies forming • Online spaces emerge • Incubators, Accelerators initiatives 	<ul style="list-style-type: none"> • Fragmentation of tech and non-tech community • Not enough common projects for improving quality of life in lasi • More spaces to gather in neighborhoods
 Finance	<ul style="list-style-type: none"> • European and national funds for digitalisation have started to be up-taken more. • Private investment follows growth. 	<ul style="list-style-type: none"> • Cash flow is a problem with publicly funded projects • Lack of local Venture Capital & Private Equity • Low appetite for risk & low qualified staff in finance
 Support services	<ul style="list-style-type: none"> • Public support services which replicate European wide: EEN, accelerators, incubators. • Private support services offers emerging 	<ul style="list-style-type: none"> • Low level of awareness of opportunities • Unclear processes and timelines for authorisations • Data of upcoming projects unavailable
 Governance & leadership	<ul style="list-style-type: none"> • Looking for the best practices already • Local tech & innovation leaders emerge 	<ul style="list-style-type: none"> • Unclear legislation; limiting public-private coop. • Coordination and control levels with central authorities = additional bureaucracy. • Little bottom up approach; no freelancer status possible.

	Opportunities	Threats
	Infrastructure <ul style="list-style-type: none"> • Full e-services and e-signature to be implemented and citizens made aware of them being available • IOT,LoRA deployments can be done w care for cybersecurity • unused internet infrastructure • Public spaces co-designed w artists/architects/users 	<ul style="list-style-type: none"> • Access to street furniture limited by current contracts • Legislation for cables to go underground pushed up costs for fiber & network upgrades • Lack of collaboration between institutions managing infrastructure & unclear implementing rules
	Access to data <ul style="list-style-type: none"> • Open platform with info for businesses& investors • Expanded sensor network in the city = public datasets = open & promoted to business & citizens • Cloud computing entices to shared resources 	<ul style="list-style-type: none"> • Systems built in the city fragmented (e.g. health) • Financial pressure = poor cybersec = local storage and ad hoc data retrieval • GDPR application will be a test for an immature data sharing market
	Digital skillset <ul style="list-style-type: none"> • Extension of informal education in IT & formal education choices in ICT on the rise • Open innovation could be applied if products were deployed & tested in Ro. market • Brain regain ; Longer vision on labor market needs linked with Universities 	<ul style="list-style-type: none"> • Brain drain is still a reality. • The gap of digital skills may grow if not more of the workforce is carried through other sectors of the economy. • Less and less teachers available.
	Companies' digital competencies <ul style="list-style-type: none"> • Traditional industries need the help & there are local ICT skills • Informal education – more accessible skills 	<ul style="list-style-type: none"> • Lack of communication and investment between traditional industries and ICT can only widen the digital divide. • Lack of financing for traditional businesses will slow digital skills training of workforce
	Community <ul style="list-style-type: none"> • There is appetite for cooperation, projects could be built between local actors • Maturing the funnel of funder providers & increase opportunities awareness for businesses & other beneficiaries 	<ul style="list-style-type: none"> • Need to go beyond initial networking and have a real Open innovation approach to solving problems • Finances are limited • Bureaucracy • Large number of events with unclear quality
	Finance <ul style="list-style-type: none"> • Recent ICT success stories inspire more enterprises to be created • Co-investment funds could be created • Start of seed funding in accelerators 	<ul style="list-style-type: none"> • Central govt keeps decision on some funding priorities & budgets & in general politics mix too much w investment decisions • Neutrality obligation makes public intervention difficult in Romania in general (other investment priorities) • Unpredictability of markets & economic sector
	Support services <ul style="list-style-type: none"> • Create a common platform of updated information for businesses and citizens • Clear deadlines & procedures for businesses 	<ul style="list-style-type: none"> • Equality of access & more awareness • Public support of services is limited by other investment pressures, availability of high quality consultants as well is a problem.
	Governance & leadership <ul style="list-style-type: none"> • Emerging community who self organises on local priorities • Demand from business and citizens for more digital services could create the right political pressure to organise & invest collab • Create the right legal framework for public and private partnership 	<ul style="list-style-type: none"> • Unstable and unclear legislative framework • Digital policy and efforts are not a priority often as other economic & social priorities are consuming the resources.

Appendix I: Table of abbreviations and definitions

Digital Cities Challenge (DCC)

The Digital Cities Challenge initiative, was launched by the European Commission in November 2017 and scheduled to run until August 2018. It helps cities (The Digital Cities, referred as DC) develop and implement digital policies that can transform day to day life for residents, businesses, workers, and entrepreneurs.

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 the city 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)

The objective of the KPIs is to 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. The 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 right identification of the key success factors of the different initiatives and actions undertaken.

Self-Assessment Tool (SAT)

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. It is an online-tool developed by the project with a set of questions and corresponding response options to be filled in collectively by a set of stakeholders such as industry representation, utility companies, education and research and financial institutions. The SAT covers eight key dimensions: Infrastructure, Open data, Digital skillset, Digital competencies of companies, Community, Finance, Support services, Governance and leadership.

Appendix II: Bibliography

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