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Research for REGI Committee - Digital Agenda and Cohesion Policy

Volume II

Abstract

This study provides a critical analysis of the contribution of Cohesion Policy and the European Structural Investment Funds to the Digital Agenda for Europe and the Digital Single Market. Based on the analysis of past and current patterns of ESIF digital investments and selected case studies, this study shows that Cohesion Policy should concentrate where its added value is highest, i.e., on support to the formulation of effective regional digital strategies and on the promotion of partnerships between relevant stakeholders, at regional level and beyond.

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LIST OF ABBREVIATIONS

AEC	Agri-Environment-Climate
ANBI	Associazione nazionale consorzi di tutela e gestione territorio e acque irrigue (Water Boards Italian Association)
ARPA	<i>Azienda Regionale per la Protezione Ambientale</i> (Regional Environmental Protection Agency)
BPM	Business Process Management
CARPF	<i>Communauté d'Agglomération Roissy Pays de France</i> (Public cooperation body between several cities in the Roissy/Gonesse area)
CEE	Center for Electric Power and Energy
CER	<i>Canale Emiliano Romagnolo</i> , one of the most important hydraulic works in Italy
CPDP	Centre for Projects Digital Poland
CSRs	Country Specific Recommendations
DAE	Digital Agenda for Europe
DESI	Digital Economy and Society Index
DTU	Danish Technical University
EAFRD	European Agricultural Rural Development Fund
EDPR	Europe's Digital Progress Report
ERDF	European Regional Development Fund
ESF	European Social Fund
EU	European Union
EUP DA	European Union
FABLAB	Fabrication Laboratory (small-scale workshop for digital fabrication)
GVA	Gross Value Added
GDP	Gross Domestic Product
HVAC	Ventilation and air conditioning systems
ICT	Information and Communication Technologies
INFO	<i>Instituto de Fomento de la Región de Murcia</i>
INE	<i>Instituto Nacional de Estadística</i> , Spanish Statistical Office
IoT	Internet of Things
ISTAT	<i>Istituto nazionale di statistica</i> , Italian Statistical Office
ITI	Integrated Territorial Investments
KU	University of Copenhagen

LAU	Local administrative unit, basic components of Classification of Territorial Units for Statistics (NUTS) regions
LU	Lund University
MaH	Malmö University
NEN	National Education Network
NGA	Next Generation Access
NUTS 3	Nomenclature of Territorial Units for Statistics, third level
OECD	Organisation for Economic Co-operation and Development
ÖKS	Öresund-Kattegat-Skagerrak
OP	Operational Programme
OPDP	Operational Programme Digital Poland
ÖRUS	Öresund Regional Development Strategy
PLIE	<i>Plan Local pour l'Insertion et l'Emploi</i> (Local Plan for Inclusion and Employment)
PDO	Protected Designation Of Origin
PGI	Protected Geographical Indication
RDP	Rural Development Programmes
RIS3	Guide on Research and Innovation Strategies for Smart Specialisation
R&D	Research & Development
SCA	Smart City Accelerator
SMEs	Small and Medium Enterprises
SPIS	Social Protection Information System
SRDEI	<i>Stratégie Régionale de Développement Economique et d'Innovation</i> (Regional Strategy for Economic Development and Innovation)
STEM	Science, Technology, Engineering and Mathematics
SWOT	Strengths, Weaknesses, Opportunities, and Threats
TEA	Total Early-Stage Entrepreneurial Activity
TO	Thematic Objective
UUA	Used Agricultural Areas
WSIS	World Summit on the Information Society
YEP	Youth Employment Initiative

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1. CROSS-BORDER SMART CITIES ACCELERATOR (DENMARK – SWEDEN)



1.1 Introduction

The Smart City Accelerator project (hereafter SCA project) - co-financed by the Interreg Öresund-Kattegat-Skagerrak (ÖKS) Programme 2014-2020 - gathers municipalities, Academia, research institutions and companies from the cross-border Denmark-Sweden Oresund Region¹. It brings these actors in close collaboration, focusing on energy optimisation and the shift towards renewables, by relying on the use of digital solutions. Several reasons have induced the selection of this case study beyond its cross-border dimension. Specifically, the following project's features have been taken into account during the selection process:

- **ICT as an enabling technology:** digitalisation is a key ingredient of the project but not its ultimate objective. Advances in digital solutions are perceived as a factor enabling the achievement of environmental objectives, which is high on the Danish and Swedish policy agendas.
- **Capitalising on previous partnerships and fostering an innovative governance framework:** the project builds on the knowledge acquired through previous similar experiences, as well as on existing fruitful ongoing partnerships between companies and academic institutions. However, as a step forward, it fosters an active role for the municipalities, bearer of their daily energy and climate challenges. The project's structure combines the different interests at stake reflecting municipalities' needs and academic priorities.
- **The use of demonstration projects and the role of partnerships between private and public stakeholders:** the project relies on the use of demonstration projects allowing real-world testing of digital solutions, in order to identify what delivers results and what does not. It also enables stakeholders to tailor these solutions to local needs and specificities. The benefits of this approach are exploited for the implementation of these demonstration projects, by selecting international specialised companies responsible for their implementation.
- **Strategic relevance:** the project is an example amongst many other ongoing initiatives; it is likely to contribute to the growth of smart cities in Denmark and Sweden.

1.2 Strategic and policy framework

1.2.1 Territorial needs

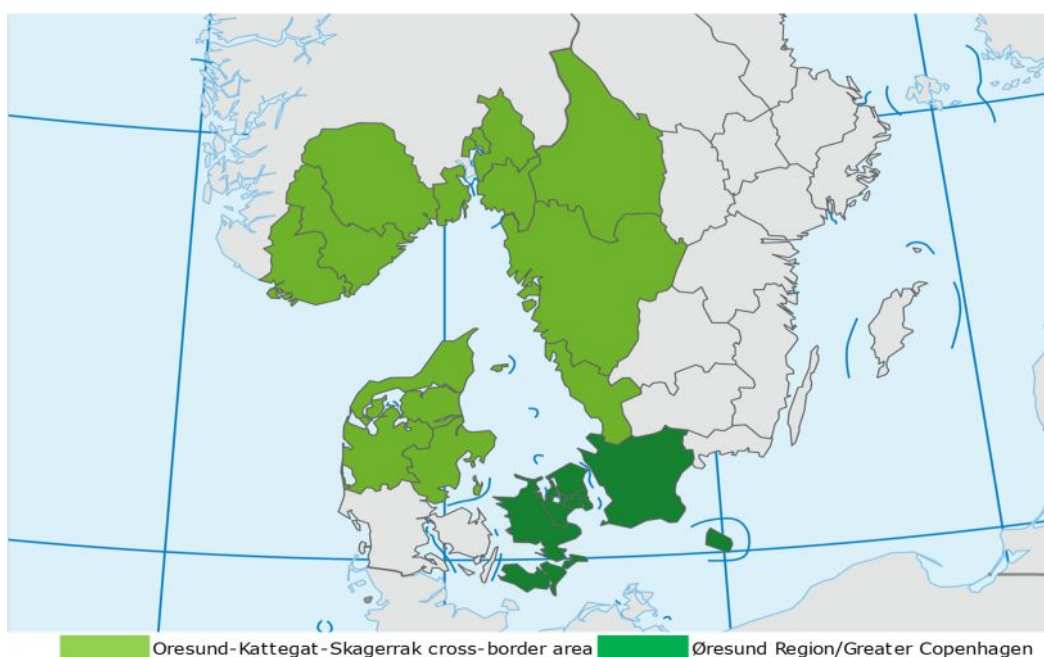
The SCA project is **anchored to the Oresund Region** (also known as Greater Copenhagen) spanning from Eastern Denmark to Skåne in Southern Sweden and centred around the Oresund strait, a 20-kilometre wide maritime area with a bridge/tunnel connecting the two sides through fast train and road links. On the Danish side, two of the five national regions (covering 46 municipalities) are included: Copenhagen, the densely-populated Denmark capital, and the neighbouring Zealand Region. On the Swedish side, Malmö (the regional administrative capital), Helsingborg and Lund are the main cities in the region of Skåne (33 municipalities), all three being located near or along the strait. Overall, the Oresund Region

¹ Øresund is Danish and Öresund is Swedish, Oresund in English. In this study the English form is used except where it appears otherwise in established names and titles.

hosts about 3.9 million inhabitants. As showed by the following map, it is nested in the wider Oresund-Kattegat-Skagerrak cross-border area (around 9 million of inhabitants and covering an area of 125 588 km²), which also includes Northern parts of Denmark, additional parts of Sweden and some Norwegian counties (see the 'Local strategic and policy context' Section on details on the OKS Programme).

The Oresund Region boasts a **core-periphery configuration**, as most of the population, economic growth and activities are concentrated in direct proximity of the strait, **around Copenhagen and Malmö-Lund**. The eastern part of Skåne and the Danish Zealand regions are both more rural and more sparsely populated. The increased accessibility offered by the Oresund bridge since its building in 2000 enables the commuting of people across Southern Oresund. This commuting highly occurs one-directionally, with around 95 % of commuters living in Sweden and working in Denmark.

Map 1: The Oresund Region within the OKS Programme area



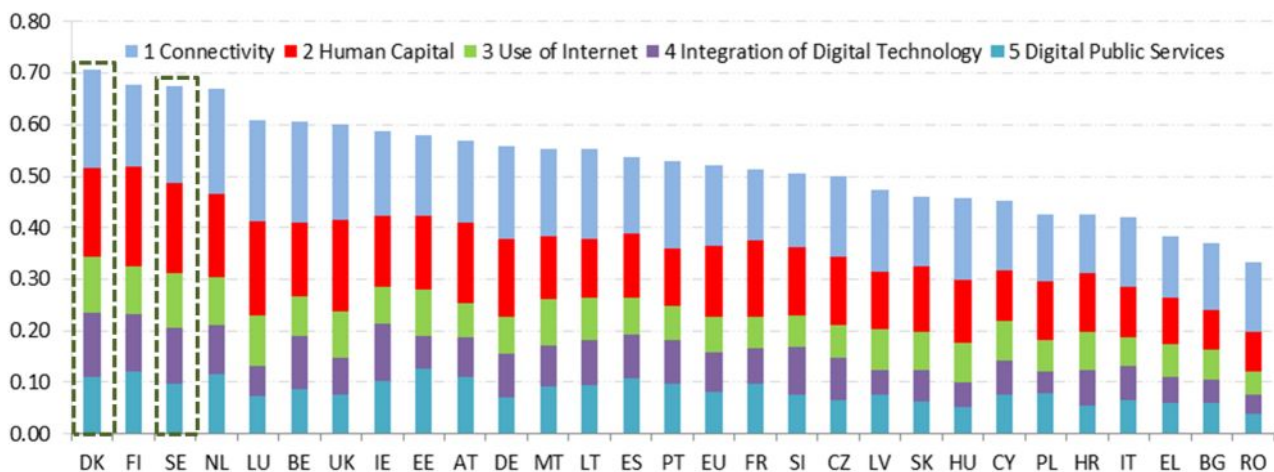
Source: Authors

From the economic point of view, the Danish side of Oresund is a more important economic region in its national context, compared to the Swedish side: the former represents 49% of the Danish GDP while the share of Skåne in Sweden's GDP only amounts to 11%². However, **both regions share knowledge-based economies** and hosts academic institutions, ambitious cities and clean-tech businesses actively working towards the sustainable urban transformation of the region. Amongst the main challenges faced by the Oresund Region, there is the importance to lay down the foundations for energy and transport systems in renewable energies and becoming fossil free. Copenhagen and Malmö, respectively from the Danish and the Swedish sides of the Oresund region, are front-runners in this regard. As emerging smart cities, they **foster the use of ICT solutions and digitalisation to become more resource and energy-efficient**, improving service delivery and quality of life while reducing their environmental impact.

² Nauwelaers et al. (2013), *The case of Oresund (Denmark-Sweden) – Regions and Innovation: Collaborating Across Borders*, OECD Regional Development Working Papers, 2013/21, OECD Publishing.

Both **Denmark and Sweden** have been making outstanding progress in the use of digital technologies, by leading the EU and the world rankings. As reported by Europe's Digital Progress Report (2017), they **are high performing countries in terms of digitalisation**, by ranking 1st and 3rd, respectively, out of the 28 EU Member States and progressing at a higher pace than the EU average. They have achieved good results in most dimensions, such as on connectivity (thanks to the widest 4G coverage and the increase in take-up of fast connections), on the number of ICT specialists in the country, on the use of the internet by citizens and businesses and the delivery of online public services.

Figure 1. Digital Economy and Society Index (DESI) 2017: Denmark and Sweden ranking



Source: Authors based on EDPR (2017), *Europe's Digital Progress Report 2017*³

In both countries, there are **several initiatives and strategies using ICT as a horizontal priority for the achievement of national targets**. As discussed below, benefits arising from the use of digital technologies can be exploited in many different sectors. The SCA project illustrates the case of the energy sector and more specifically, it shows how ICT can be used to reduce the impacts of climate change.

1.2.2 Local strategic and policy context

In what follows, an overview of the primary policy initiatives adopted at national, regional and local level – in the countries involved in the SCA project – is provided. Particular attention is paid to the strategies regarding the application of ICT to foster the green economy.

Digitalisation is a debated issue in Denmark and Sweden since the 1990s. Compared to other EU Member States, forward-looking investments have already been carried out in the two countries – such as building faster (fibre-optic) networks – which gave them a head start of many years in implementing digital solutions. In both cases, the adoption of digital solutions is a priority in national, regional and local agendas, especially to transform urban areas. In compliance with the EU2020 strategy, **Denmark and Sweden foster the use of green technologies as a means to achieve resource efficiency and sustainable growth** (including as a market of its own). In this regard, Copenhagen was awarded in 2014 the prestigious international World Smart Cities Award in Barcelona for having the world's best

³ For more details, see [Europe's Digital Progress Report 2017](#)

plan to collect and use data to improve environmental performance, quality of life and business climate. Box 1 below briefly summarises objectives in Denmark and Sweden regarding energy efficiency. Digital solutions are expected to contribute to these objectives.

Box 1: Denmark and Sweden's objectives to become greener countries

Denmark: In 2011, the Danish government published its Energy Strategy for 2050, which includes the following goals: i) Complete independence from fossil fuels by 2050; ii) Ranking amongst the top three energy efficient OECD countries by 2020; iii) Energy savings improvements of 85% (from 2010 levels) by energy companies by 2050; iv) Lowering of national primary energy consumption levels for the 2008-2011 period to 4% lower than 2006 levels; v) Decreasing greenhouse gas (GHG) emissions by 30% (from 1990 levels) by 2020; and vi) Powering the transportation sector with 10% renewable energy by 2020.

Sweden: Sweden's government has set itself a number of ambitious climate and energy targets for the future. By 2020, the government intends to: i) obtain half of Sweden's energy demands from renewable energy sources; ii) achieve a 40% reduction in GHG emissions, as compared to 1990 levels, in those sectors not covered by the EU's Emission Trading System (ETS); iii) reduce GHG emissions in sectors that are covered by the EU's ETS by 21% (in accordance with EU targets); iv) use at least 10% of renewable energy in transport; and v) realise energy efficiency gains of 20%.

Source: Authors.⁴

Under the umbrella of **new governmental digital plans** – such as the *Digital Strategy 2016-2020* adopted in May 2016 – Denmark aims at further enhancing public sector commitment to deliver high-quality, efficient and coherent services to citizens and businesses. Amongst the three goals pursued by this strategy⁵, there is the objective of ensuring the conditions for growth **using smart cities partnership and open data on energy supply**. Similarly, Sweden has adopted in May 2017 a *sustainable digital transformation strategy* addressed to promote, amongst others, a resource-efficient society.

At regional level, the *Interreg Öresund-Kattegat-Skagerrak Programme 2014-2020* is also investing in green growth by increasing the production and use of renewable energy, by improving and extending distribution networks, by promoting innovation in renewables and by decreasing energy consumption in the public sector. **Investments in low-carbon economy** account for 25% of the total programme budget⁶, being **the second highest priority following research and innovation**.

At **local level**, the Öresund Committee⁷ has formulated – in collaboration with other stakeholders (e.g. companies, municipal and regional authorities, universities, etc.) – a **development vision for the Oresund Region** – namely ÖRUS – with a time horizon of 2020. The vision is spelt out as follows: *'By maximising the benefits of integration and cross-border dynamics, the Oresund Region will stand out as the most attractive and climate-smart*

⁴ Based on International Institute for Industrial Environmental Economics (2011), *Energy Futures Øresund – Bridging the gaps to a greener tomorrow*.

⁵ For details see, the Government /Local Government Denmark /Danish Regions / (2016), *A stronger and more secure digital Denmark: Digital Strategy 2016-2020*.

⁶ The Programme budget amounts to EUR 271.4 million for 2014-2020 period.

⁷ The Öresund Committee is made up of representatives from different political levels of the Danish and Swedish sides of the Region. It sets the agenda of the cooperation and it is understood as the 'embassy' of the region in front of the national parliaments.

region in Europe.⁸ A further relevant strategy is the City of Malmö's environmental program 2009-2020, according to which Malmö is committed to becoming a global role model in using IT as a communicative, sustainable and innovative means for climate-smart urban development.

1.3 Main features of the selected project

1.3.1 Description

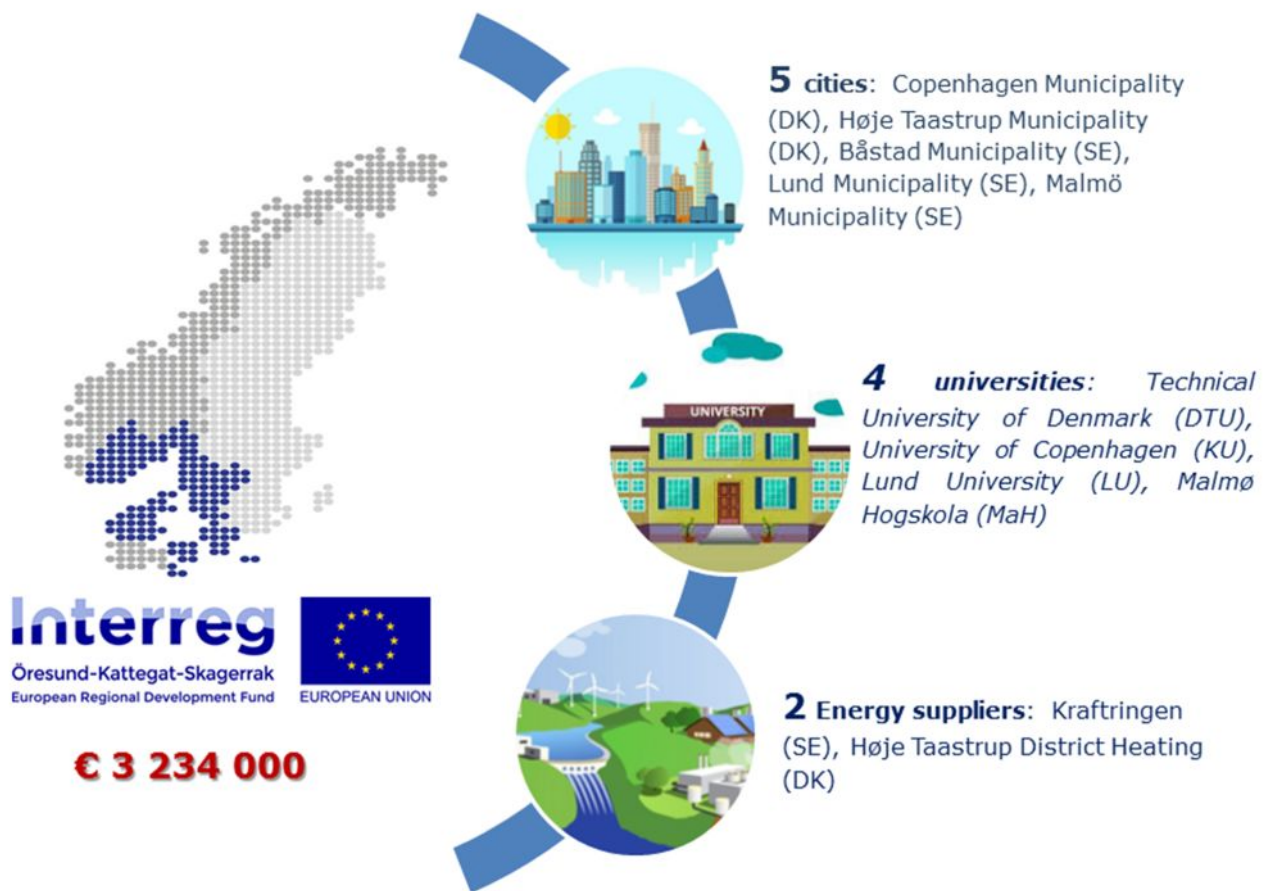
Smart City Accelerator (SCA) is a **cross-border project** building on a partnership between large and small municipalities, pluri-disciplinary academic institutions and energy suppliers sharing the main objective to promote – through the use of ICT solutions - energy optimisation and the shift towards renewable energy sources in the Greater Copenhagen area. Specifically, the project aims at **facilitating knowledge exchanges and the development of demonstration projects** that can lead to more sustainable solutions within the municipal energy supply system, ranging from energy production to energy consumption.

A total of EUR 6 468 000 is invested in SCA for a period of three years, from September 2016 to August 2019. **Half of the budget is financed by the European Regional Development Fund** (ERDF) under the Interreg Öresund-Kattegat-Skagerrak Programme 2014-2020 (European Territorial Cooperation). The remaining funds are provided by the 11 stakeholders involved in the project⁹, namely five municipalities, four academic institutions, one district heating company and one energy company (see below and Appendix for more details on their role).

⁸ Nauwelaers et al. (2013), *The case of Oresund (Denmark-Sweden) – Regions and Innovation: Collaborating Across Borders*, OECD Regional Development Working Papers, 2013/21, OECD Publishing. <http://dx.doi.org/10.1787/5k3xv0lk8knn-en>

⁹ All 11 partners are equally co-financing the project. It was the obligation for all partners taking part in the Interreg-ÖKS programme that they must present 50% co-financing of the total budget.

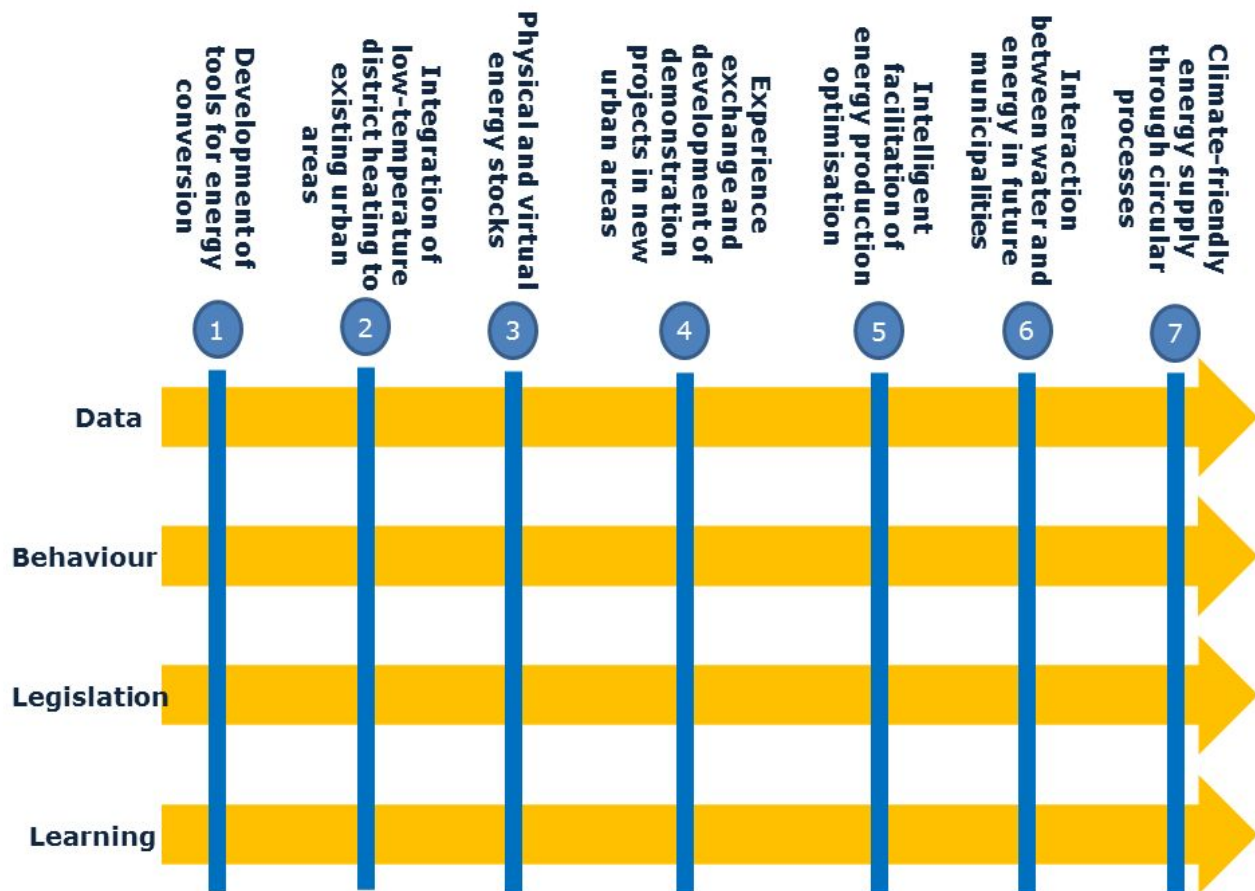
Figure 2. SCA stakeholders and financing breakdown



Source: Authors.

The **municipalities involved in the project are the primary target group** for SCA. However, SCA's long-term ambition is to boost a new paradigm of energy production and consumption across the whole Danish-Swedish region of Greater Copenhagen (accounting for 3.9 million inhabitants). For the completion of this objective, the project relies on an **innovative form of governance which encapsulates vertical and horizontal goals**, with leading institutions selected accordingly (see Appendix for details). The project's activities are designed as resulting from the combination of seven vertical focus areas within the energy sector, and four cross-sectoral horizontal areas anchored in research and policy interests, such as data, behaviour, law/regulations and learning. The figure below provides an overview of the vertical and horizontal axes underlying the implementation of SCA. As explained in the next paragraph, most of the SCA vertical axes arise from research activities carried out in the framework of an already existing project, namely the CITIES project.

Figure 3. SCA vertical and horizontal structure in a nutshell



Source: Authors.

1.3.2 Project cycle

The project idea originates from the Danish Technology University, which is also the lead partner of SCA, and relies on the knowledge acquired with an ongoing project, the CITIES¹⁰ project, addressed to develop methodologies and ICT solutions for the analysis, operation, planning and development of fully integrated urban energy systems. **SCA has been conceived in synergy with the CITIES project, but also as a step beyond it.** Since its design, a key 'ingredient' of the SCA project has been the involvement of municipalities from the Oresund area and not only of academic and industrial partners. The underlying rationale is to **foster cooperation between cities and businesses**, bearer of their daily energy and climate challenges, and university researchers who define and develop solutions, as well as demonstration projects. This approach makes it possible to test the developed solutions on the ground, thanks to the expertise provided by the academic experts.

Structuring the SCA partnership was the most challenging aspect of the project. It required six months of informal discussion, as well as a leading role by DTU in motivating cities, academic partners and companies to join the project and accept to co-finance it. The project was officially launched on October 13-14th 2016, and it is currently in its second year of

¹⁰ Centre for IT-Intelligent Energy System in Cities (CITIES) is a project launched in January 2014 and running until 2019. The project benefits from an overall financing of EUR 7 million provided by wide range of industrial and academic partners and the Danish Council for Strategic Research. For more details see <http://smart-cities-centre.org/>

implementation. Adjustments have been needed since its start. Some partners have wanted to reduce their involvement in the SCA compared to the initial application to the Interreg ÖKS Programme, mostly because of change of staff and priorities within a partner organisation. These occurrences have forced the project manager to seek new partners to join the SCA, in order to comply with the allocated budget from Interreg ÖKS Programme. Three further DTU institutes have therefore been involved (in total five different DTU institutes currently contribute to the project's implementation) and in 2017, six months after the project start, the Swedish Energy Company has also entered the project.

Each partner plays an active role in the project implementation. While the five municipalities involved lead the seven vertical focus areas in which they have high interests¹¹, researchers and professors from the universities lead the horizontal areas. For each vertical focus area, climate targets and specification for demonstration projects are jointly defined by the leaders of the vertical axes and experts on the four horizontal areas.

An active role in the project implementation is also played by **EIT Climate-KIC**¹², the EU's largest public-private partnership addressing climate change through innovation, aiming at building a zero carbon economy. EIT Climate-KIC is **a subcontractor in the project** and delivers a service of 'seven Open Innovation processes' to bring innovation and more companies into the project. Since the preliminary discussion of the SCA project, DTU ambitions have been to combine the knowledge acquired through the CITIES research project with the EIT Climate-KIC's business approach to climate change. The central role played by EIT Climate-KIC is indeed to **screen and select the most active international companies to join the demonstration projects** identified in the framework of the SCA project. EIT Climate-KIC is expected to manage seven Open Innovation calls and events in the partnering cities regarding the seven vertical focus areas of the SCA-project. It will also deliver an online Open Innovation portal and an education manual on Open Innovation for city officials.

Basically, by combing the seven vertical axes and the four horizontal axes, the following three sub-objectives and targets are expected to be achieved by the project in the short-run:

1. **Establishing at least seven regional platforms** - one for each of the seven vertical focus areas - to promote knowledge sharing on how to create better and faster renewable energy solutions.
2. **Developing at least seven demonstration projects** that can increase the proportion of renewable energy consumed. Demonstration projects should arise out of the specifications developed jointly between the vertical and horizontal project teams.
3. **Recruiting** - through open innovation calls and international branding - strong, **innovative companies for demonstration projects** within the seven vertical focus areas. The goal is reached when at least ten companies relevant to each of the seven areas are selected, and when at least one company in each focus area has the proper expertise for being involved by the SCA partners in the related demonstration projects.

After **5-10 years from its start**, SCA project is expected to:

- Have significantly **increased the proportion of renewable energy consumption** in the five municipalities participating in the SCA project.
- Have **established a self-running, integrated Danish/Swedish organisation**, SCA, that can create new knowledge about development and implementation of smart, persistent energy systems.

¹¹ Some municipalities lead more than one focus area.

¹² Launched in 2010, EIT Climate-KIC is one of the three original Knowledge and Innovation Communities set up by the European Institute of Innovation and Technology. For details, see <http://www.climate-kic.org/>

- Have **created smart energy implementation models** to be exported internationally in other cities for achieving a higher climate effect.

Demonstration projects are the key tools for achieving SCA objectives. Their design and implementation will take some time as well as a continuous discussion amongst SCA partners through workshops and meetings. In what follows, some examples of demonstration projects which have been promoted so far in the framework of the SCA project are provided.

Box 2: Demonstration projects: some examples from SCA implementation

EnergyBlock: One of the demonstration projects in SCA focuses on the EnergyBlock, a building block in the Copenhagen Nordvest district. Linked to the vertical theme 4 on demonstration in city districts (see Figure 3 above and Box in Appendix), the EnergyBlock serves as a physical platform for the research carried out by the Center for Electric Power and Energy (CEE)¹³ in the framework of the SCA project. CEE contributes to this project with technical expertise in both installations and market coordination. The specific demonstration is performed together with Copenhagen Solutions Lab¹⁴ and consists in testing sustainable solutions based on decentralised energy and blockchain technology. The main focus is on investigating the mathematics behind the new electricity markets able to integrate an increasing number of households operating their solar panels, heat pumps, batteries and electric cars - thereby becoming both consumers and producers of energy – so-called ‘prosumers’.

Skoleklima.dk: Amongst the SCA goals, there is the aim to apply simple and cost-effective smart solutions to get the best indoor climate and thermal comfort at the lowest energy cost in schools located around the greater Copenhagen area, the municipalities of Malmö and Lund in Sweden. Skoleklima.dk is an online platform which contributes to the achievement of this objective by enabling the visualisation and evaluation of data collected in primary schools. It is linked to the vertical theme 1 on development of energy efficient tools in public buildings (see Figure 3 above and Box in Appendix). Over 100 classrooms located in three different schools of the Høje Taastrup Municipality have been involved in this demonstration project. Wireless sensors have been installed in classrooms to enable the monitoring. The *Skoleklima.dk* platform offers scholars and teachers the opportunity to visualise their own classrooms’ data and get a key for a qualitative interpretation of those measurements. Moreover, through *skoleklima.dk*, students can run experiments to understand the physics behind the ventilation and air conditioning systems (HVAC) and the indoor climate. Finally, *Skoleklima.dk* offers the possibility to exchange information related to the indoor climate and the HVAC system between teachers, and between teachers and buildings’ managers.

Source: Authors.

1.3.3 Contribution to the strategy in place and to the Digital Agenda for Europe/Digital Single Market

SCA specifically contributes to the EU ÖKS programme’s objective to promote a low carbon economy in the Öresund-Kattegat-Skagerrak region. In compliance with this objective, the project fosters the production and use of renewable energy, innovation in renewable energy and the decrease of energy consumption in the public sector. In order to do so, SCA relies on the use of ICT solutions, thus **contributing to one of the pillars of Digital Agenda for Europe, namely ICT-enabled benefits for EU society**. SCA exploits the potential offered by ICT to face climate change challenges, explicitly allowing digitalisation to have a role in cutting

¹³ For more details, see: <http://www.cee.elektro.dtu.dk/>

¹⁴ For more details, see: <https://cphsolutionslab.dk/en>

greenhouse gas emissions and improving energy efficiency (e.g. a means for modelling, analysing, monitoring and visualising energy data). The project is also in line with the national strategies adopted in Sweden and Denmark (discussed in Section 'Local strategies and policy context') to promote the development of **smart cities, as front-runners in exploiting the opportunities opened up by digitalisation**.

1.3.4 Success factors, limitations and other issues

The **partnership** established amongst municipalities, business and academic sectors can be considered as the primary achievement, as well as the **key success factor**, of the SCA project. Building on the lessons learnt from previous projects, SCA has allowed different stakeholders, bearing different interests, to collaborate for the achievement of an objective of general interest. The composition of the partnership has specifically contributed to the translation of solutions '**from laboratories to the reality**'. The involvement of municipalities in the project's design and implementation phases has been crucial to steer project's activities toward real climate change challenges, as well as to test the solutions designed by the academic experts and delivered by sectoral experts. Most importantly, having citizens involved has allowed creating a sort of '**energy community**' motivation and paving the way for a **positive behavioural change**.

The use of **demonstration projects is another positive aspect** of the SCA project. It has contributed to raising awareness amongst the citizens involved, as well as to attract businesses and create new commercial opportunities. Such accomplishment is indeed expected to be the main strategy for ensuring the long-run sustainability of the project.

The **role played by EIT Climate-KIC is crucial** for the success of the project. With a portfolio of more than 12 innovative start-ups and SMEs, Climate-KIC is expected to recruit strong, innovative companies for the implementation of the demonstration projects. Interestingly, building on the knowledge acquired with SCA project and previous experiences, DTU and EIT Climate-KIC are currently cooperating to export Nordic smart cities solutions to Singapore using 'smart city labs' with the aim of creating cities where it is pleasant to live.¹⁵

The **support provided by the Cohesion Policy is a great added value for the project**. Without it, stakeholders involved – especially the municipalities – would not have been willing to co-finance the project, because of their lack of resources. However, **a higher co-financing rate provided from ESI funds** (such 100% as provided in the H2020 projects Innovative Actions programme) **would have allowed for a higher number of municipalities and universities involved in the project**. In particular, interviews confirm that it has been a real challenge to motivate the universities to become part of the Interreg ÖKS programme with a co-financing rate of 50% (in compliance with the requirements of EU rules). The collaboration has been kick-started – and it is most likely that universities and municipalities will continue to discuss. However, EU and non EU financial support needs to be found to maintain the cross-regional collaboration.

As pointed out by the interviewees, the **SCA pluridisciplinary approach can yield good results for all sorts of sectors**. It is only a '*matter of doing it, crossing barriers and going across silos*'.

¹⁵ The collaboration has started in 2017 and is expected to last one year. It runs in the framework of the project Smart City World Labs which is financed by the Climate-KIC and builds on a grant from the Danish Industry Foundation. The project involves DTU, Quercus Group, Gate 21, City of Copenhagen, the Danish embassy, Singapore and Nanyang Technological University in Singapore. For details, see <http://smartcityworldlabs.com/>

1.4 Conclusions and Lessons Learnt

SCA is an example of how **ICT can be used as a tool for enabling higher energy efficiency and achieving climate change's objectives**, consistently with EU, national, regional and local ambitions. Although still ongoing, the project is likely to contribute to progresses in the monitoring and evaluation of energy consumption, to raise awareness toward renewables and provide solutions for the smart transformation of the municipalities involved, which can also be exported and transferred to other contexts. As the region and its stakeholders have been forerunners for digital transition and attention to environmental issues, the **contribution of Cohesion Policy is likely to secure more resources for these goals**, but also to strengthen partnerships and favour innovative approaches.

Indeed, the most interesting point is the project governance, from which a number of lessons can be learnt. SCA shows how **adopting a holistic view can enable changes**. It entails multi-disciplinary cooperation between academics, sectoral experts and end users to detect and test the real potential and benefits of various forms of ICT-driven innovations for a more energy efficient society. Each stakeholder involved plays an active role in the project: academic institutions bring their knowledge and expertise for the development of innovative solutions; businesses provide their competence for developing them, municipalities bring their challenges and needs on which digital solutions are tailored and act as a 'testing bed'. In particular, the **Public-Private Partnerships at the EU level** (through EIT Climate-KIT) can be considered as **a key value added to implement projects co-financed by Cohesion Policy successfully**. This governance has been set in the context of an INTERREG programme, building from previous cooperation between stakeholders. This approach enables to create motivation amongst the stakeholders towards the achievement of a common objective and paves the way for the sustainability of the project's results in the long-run. However, some Cohesion Policy rules (such as the maximum co-financing rate) are also thought as factors that have limited the scope of the project.

1.5 Appendix

Box 3: SCA vertical and horizontal axes

The SEVEN vertical axes have been identified on the basis of four main criteria: i) *High priority* (the challenges are high priority for the city partners, and there is already a budget for development activities); ii) *Upcoming* (the challenges must be solved within a number of years, consistent with the project's three-year lifespan); iii) *Great complexity* (the demonstration project has a complexity level where interaction between several actors is an advantage); iv) *Volume* (several actors prioritise the challenge).

1) Developing better tools for energy conversion - Energy classification of buildings - including the municipalities' buildings.

Stakeholders involved: CITY lead: Høje-Taastrup Municipality; SCIENCE lead: Danish Technical University (DTU)

During the CITIES project, methods for energy classification of buildings were developed by using frequent measurements of energy. These methods allow for an objective classification of the thermal characteristics of the buildings as well as for an automatic correction according to different weather conditions and differences in user behaviour. For instance, results of the methods developed show whether the windows need replacement, the presence of leaks, if the ceiling should be insulated, etc. In the framework of this axis, it is expected to continue with demonstration projects in this field and provides advice for improving user behaviour.

2) Integration of low-temperature district heating to existing urban areas

Stakeholders involved: CITY lead: Høje Taastrup Fjernvarme/district heating; SCIENCE lead: DTU

On both sides of the Oresund region, there is a large proportion of district heating systems which are quite different. The aim of this axis is to promote the interaction between district heating and electricity systems and the integration of large volumes of solar and wind energy. In the framework of the CITIES project, new data and forecast-based methods were developed for optimised flow control as well as for optimised use of thermal energy storage in both power lines and accumulator tanks in district heating systems. This axis will continue to develop innovative methods by focusing for instance on the potentials for solar power stations in these low-temperature district heating.

3) Physical and virtual energy stocks

Stakeholders involved: CITY lead: Malmö Stad; SCIENCE lead: DTU

Under CITIES, a number of methods were developed for optimised operation of energy storage. This applies to both physical storage (accumulator tanks, pressure tanks, etc.) as well as methods for virtual energy storage consisting in the transfer of energy in time and place through the coordination of energy systems. Through the use of data and forecasts, suitable models can be found for optimal integration of different energy systems, thus obtaining 'virtual' energy storage (eg. to switch from biogas to electric cartridges in a district heating system).

4) Experience exchange and development of demonstration projects in new urban districts / urban areas

Stakeholders involved: CITY lead: Lund/ Copenhagen; SCIENCE lead: DTU

The aim of this axis is to promote the exchange of demonstration projects amongst the urban development areas that are planned or underway among SCA partner cities. A number of test facilities are made available by several companies for this purpose - including Danfoss, Grundfos, NREL, and Krüger. The axis also relies on projects developed in the framework of CITIES project involving a large number of cities outside Greater Copenhagen. Examples are Tjæreborg, Sønderborg, Vejle, Aarhus, Odense, Barcelona, Trondheim, and Seoul.

5) Intelligent facilitation of energy production optimisation

Stakeholders involved: Lead: LU; Co-lead: DTU

This axis is addressed to explore how to make electricity and energy prices attractive in the Greater Copenhagen. In particular, automatic and flexible production facilities could be advantageously placed where the price of electricity is sometimes low (due to, for example, surplus wind turbine flow) and close to where the consumption is concentrated.

6) Interaction between water and energy in future municipalities - including exploring the possibilities of creating energy by moving (undesirable / redundant) groundwater through heat pumps

Stakeholders involved: CITY lead: Høje Taastrup Fjernvarme/district heating; SCIENCE lead: DTU

The aim of this axis is to develop methods for optimising the interactions between water and energy systems. For example, drainage systems represent a large stock of water that can be used to optimise pump operation in relation to the integration of wind and solar energy. Similarly, aeration of wastewater treatment plants is a very large consumer of electricity. This process can also be used in a number of conditions for better integration of wind and solar energy, simply by the fact that the wastewater treatment occurs to a certain extent when the price of electricity is at the lowest levels (and thus when there is also a surplus of electricity from solar and wind energy production).

7) Climate-friendly energy supply through circular processes (including common solutions to challenges with smaller amounts of waste)

Stakeholders involved: CITY lead: Båstad kommun; CITY co-lead: Malmö Stad; SCIENCE lead: DTU

In the smart cities of the future, an intelligent interaction between the individual energy forms (electricity, heat, gas, biomass, waste, etc.) is crucial. This intelligent interaction is provided in the framework of this axis through the use of online forecasts for energy requirements, energy prices and conditions in the system. The theme seven is not applied at the moment (March 2018) and is put on hold.

The FOUR horizontal axes identified by the SCA partners are likely to boost the effects of ICT solutions developed under the seven vertical focus areas described above.

1) Data infrastructure for smart cities and districts

Stakeholders involved: Lead: DTU; Co-lead Lund University (LU)

This is a component that can be included in all the above mentioned areas of action. Quality and availability of data should be ensured for each area of action to allow for better prediction / projection models, consumption and production forecasts, consumption adjustment for production, etc. The SCA project envisages further development of existing ICT infrastructures for data collection, data management / analytics and presentation.

2) Behavioural patterns of individuals

Stakeholders involved: Lead: University of Copenhagen; Co-lead: LU

Each intervention area must assess the extent to which people's actions can determine the success rate of the action (e.g. the increase of the share of renewable energy). Behavioural researchers / experts should be involved for the purpose of this assessment.

3) Legal affairs: smart laws for smart cities

Stakeholders involved: Lead: University of Copenhagen; Co-lead: LU

For each area of action, it is necessary to investigate whether there are regulatory barriers to developing smart energy solutions in cities that meet the long-term goals of the project. Where these barriers are identified, both regulatory changes and lobbying must be proposed to help remove barriers.

4) Learning materials: challenges for school children towards a more sustainable society

Stakeholders involved: Lead: Malmö University; Co-lead: Høje-Taastrup Municipality.

Awareness and education activities should target students on continuing the efforts for a sustainable conversion towards renewable energy sources.

Source: Authors.¹⁶

1.6 List of Interviews

INSTITUTION/ENTITY	ROLE	DATE OF THE INTERVIEW
Technical University of Denmark DTU Compute	Project Manager	06/02/2018
Technical University of Denmark	Head of a group focusing on Energy Analytics & Markets in the framework of EnergyBlock demonstration project	06/02/2018

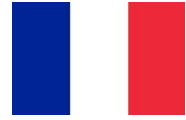
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¹⁶ Based on Annex 5 of the Project Application Form 'vertikale og horisontale indsatsområder', document provided by the Lead Project Manager, DTU.

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2. LA FABRIQUE NUMÉRIQUE DE GONESSE – E-INCLUSION (ILE-DE-FRANCE, FRANCE)



2.1 Introduction

La Fabrique Numérique de Gonesse is a social fablab (a small scale workshop focusing on digital fabrication) that uses ICT to tackle the issue of early school leaving. It has been selected as a case study because it provides insights on several elements that are critical to review how Cohesion Policy can contribute to the Digital Agenda's objectives:

- **Adaptation to the local context:** Ile-de-France (Paris Region) is defined as a More Developed Region in the Cohesion Policy 2014-2020 framework. However, it also experiences substantial challenges related to territorial and social inequalities. More specifically, the city of Gonesse is characterised by a high level of youth employment and early school leaving. This digital project provides information on how Cohesion Policy supports the alleviation of infra-regional challenges, such as poverty, education and training.
- **Type of project:** Cohesion Policy funds a wide range of projects related to digitalisation, beyond support to ICT as a sector. The *Fabrique Numérique* is considered as a successful eInclusion project, using ICT as a means to achieve inclusion objectives, rather than as an end in itself.
- **Strategic and governance framework:** The project is funded through an ITI and contributes to an Integrated Urban Strategy with a strong digital dimension at city level. It is also connected to other regional and local strategies (e.g. employment and youth). It shows how Cohesion Policy can both favour and benefit from the local strategic and governance context to achieve Digital Agenda's objectives.
- **Innovative approach (URBACT good practice):** The *Fabrique Numérique* is recognised as a successful project, stemming from its specific pedagogical approach and adapted response to territorial and social needs. It is notably labelled as a URBACT good practice. Thus, it is likely to provide key lessons for other regions in the realm of eInclusion.

As a consequence, the analysis of the experience of the *Fabrique Numérique* especially aims at collecting and analysing evidence regarding the influence of the governance/strategic framework, as well as the use of Structural Funds for projects taking ICT as a means rather than as an end-goal.

2.2 Strategic and policy framework

2.2.1 Territorial needs

Gonesse is a city (*commune*), located in the *Ile-de-France* region. The city also belongs to the *Communauté d'Agglomération Roissy Pays de France* (CARPF), a public body regrouping several municipalities (*communes*) in the area of the Roissy Airport in order to deliver common public policies (e.g. on economic development, employment, urbanism., see maps 1 to 2 in the Appendix). These three levels of government and their respective territories are directly involved in the project.

Ile-de-France is the most developed French region, with a GDP per capita PPS of EUR 50 900 in 2015, according to Eurostat. It benefits from diverse and advanced economic activities, as well as from a highly-skilled workforce. However, it is also characterised by **critical infra-regional disparities**, with several vulnerable territories and populations. The CARPF regroups 42 cities, with a significant gradient of local situations (urban/rural, level of training and economic development, etc.). Some parts of its territory are constrained by spatial fragmentation, housing problems and high unemployment. The proportion of young people is

very significant in the population; they are often insufficiently trained to join the labour market successfully. At the same time, the territory is experiencing dynamic economic growth, linked with major infrastructures (because of the proximity to the Roissy Airport) and ongoing development projects (retail/entertainment centre Europacity, extension of the Paris metro, etc.).

The city of Gonesse features even more problematic patterns of youth unemployment and education than the overall CARPF territory. Indeed, 75% of its territory is composed of deprived neighbourhoods (such as the *Quartier de la Fauconnière*, where the project is implemented on the ground). Several indicators provide more details on the issues at stake for the territory:

Table 1. Social indicators in perspective

INDICATOR	NEIGHBOURHOOD CARREAUX, FAUCONNIÈRE, MARRONNIERS, POLE GARE	GONESSE (CITY)	CARPF	FRANCE
Share of youth (< 25 y.o.) (2010)	40.1%	38.2%	38.1%	29.5%
Share of 16-24 y.o. not in education (2010)	44.9%	41.2%	41.8%	N/A
Poverty rate (2013)	34.6%	24.7%	23.1%	14%
Unemployment rate (2014)	N/A	17%	15.6%	9.9%

Source:¹⁷ INSEE & Depp (2017).

In this context, social issues are a key priority for public policies, especially to tackle low education attainment and to promote inclusion in the labour market.

Regarding digital performance, **mixed record can be observed on the territory** in recent years. In terms of infrastructure, the *Ile-de-France* region ranks relatively high in Europe, with 95% of households having access to the Internet, and 87% to broadband in 2017. However, the local situation is more contrasted. According to the *Observatoire du Très Haut Débit*, the deployment of high-speed internet (more than 30 Mbit/second) in the city of Gonesse only became a reality from 2014. Progress was important between 2014 and 2017, with significant portions of the city’s territory benefiting from 100+ Mbit/second internet access. However, the *Quartier de la Fauconnière*, where the project is implemented, is still lagging behind as of 2017 with many areas below 8 Mbit/second (see maps 3 to 6 in the Appendix).

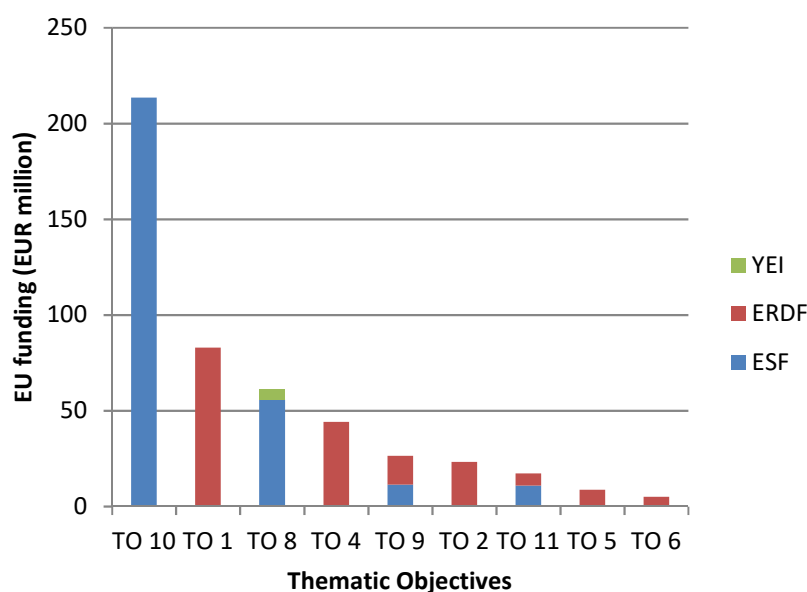
The digital sector is well established on the territory and is regarded as an important source of potential growth. At the department (NUTS 3) level, 400 enterprises are directly part of the digital sector. According to INSEE data, the ICT sector accounted for 3.1% of salaried employees’ positions at the department level in 2015, compared with only 2.7% at the national level. Additionally, several universities and research centres (notably at Cergy-Pontoise) specialise in digital-related topics. The digital sector and other opportunities related to ICT are seen as a means to address some of the needs of the territory. This link is clearly demonstrated by the local strategic and policy context.

¹⁷ Infra-city data have a frequency of collection that did not allow the use of more recent statistics.

2.2.2 Local strategic and policy context

The project is linked to different strategies at the European, regional and local levels. At the regional level, the project depends on the **Ile-de-France ERDF/ESF/YEI Operational Programme for 2014-2020**. The OP focuses mainly on education, training, inclusion and employment (Thematic Objectives 8-9-10). Together, these objectives account for 62% of the EU funding for the Region. Another key priority is the development of Research Development and Innovation through the Thematic Objective 1, which represent about 17% of allocated funding. These priorities aim at tackling the specific weaknesses of the *Ile-de-France* Region, mainly through ESF funding. In particular, key emphasis is explicitly put on the issue of school drop-outs and social entrepreneurship.

Figure 4. Distribution of EU resources in the Ile-de-France Region by Thematic Objective for 2014-2020



Source: Authors based on Ile-de-France Region (2014), Programme Opérationnel Régional 2014-2020 de l'Ile-de-France et Du Bassin de Seine.¹⁸

The OP also highlights the concentration of resources on fragile territories, notably through the ITI instrument. 20% of the ERDF/ESF resources (i.e. EUR 97.59 million) are to be implemented through 15 ITI. Indeed, **the infra-regional disparities and the deprived urban areas were identified by the OP as a factor of low competitiveness and loss of economic resources**. Investments dedicated to ICT *per se* (TO 2) are limited, as they represent only 5% of the total envelope.

The *Fabrique du Numérique* is directly linked to the Priority Axis 5, corresponding to the Thematic Objective 10 ('Investing in education, training and vocational training for skills and lifelong learning'). More precisely, this action is contributing to the Specific Objective 8 of the OP ('Increasing the employability and skills of unemployed Ile-de-France citizens'). Moreover, ICT are considered as a sector for supported training actions, in order to develop core skills. Therefore, **the strategic context shows that digital projects can be funded under other Thematic Objectives a part from TO2**, which is explicitly dedicated to ICT. At regional level, the project is thus expected to contribute to the EU 2020 objective of 'lowering the early drop-

¹⁸ See Appendix for the list of Thematic Objectives.

out rate'. However, it will also support the European Agenda's objectives related to the development of digital skills and inclusion.

In this framework, the Ex-Ante conditionalities connected to ICT¹⁹, such as the Digital Growth Strategy (fulfilled by the SRDEI²⁰ - addressing mainly economic development and R&D) / Next Generation Broadband plan (fulfilled by the SCoRAN²¹ - addressing ICT infrastructures development) are not the most relevant ones to analyse the project. Instead, at the local level (CARPF and city of Gonesse), the **project is mainly dependent on the emerging Urban Integrated Strategy**. Indeed, the CARPF is an Intermediate Body responsible for managing the European Funds in the framework of an ITI. In 2015, the *Communauté d'Agglomération Val-de-France* (a cooperation body between cities and a forerunner of the current CARPF) applied to a Regional call for tender to be selected as a territory benefiting from the ITI approach. The *Communauté d'Agglomération Val-de-France* merged with other cities in 2016 to form the CARPF. The Urban Integrated Strategy linked to the ITI is therefore also a way to consolidate cooperation between stakeholders on this new territory (e.g. between the different Directions of the public sector, between cities, etc.). The Integrated Urban Strategy was largely designed based on previous local strategies, for example the *Contrat de Développement territorial* (a policy document with a strong transportation and digital sector perspective for the territory – explicitly quoting the role of the *Fabrique du Numérique*), and the *Contrat de Ville* (a policy document bringing together all the relevant levels of government and stakeholders to favour the development of deprived neighbourhoods: economic development, social cohesion) and long-lasting support in the fields of employment, economic development and digitalisation on the territory. Benefiting from a **total ITI ERDF/ESF envelope of EUR 8 million for 2014-2020**, the Integrated Urban Strategy is built upon **three pillars: sustainable urbanism, economic development-social inclusion and digitalisation**. These pillars allow dealing with transversal issues that are of particular relevance to local territory and regional objectives, especially early school leaving. The digital axis is promoted thanks to an economic development perspective (with a flagship *Maison du Numérique* currently in planning phase: fablab, coworking, start-ups, digital training etc.), linked to a social inclusion approach. As such, the *Fabrique du Numérique* is the first digital project funded through the ITI and should contribute to the fine-tuning of the overall strategy. The project is also committed to **other local strategies and instruments**, notably the PLIE (coordination of local stakeholders in the realm of employment policy, partly funded by the ESF and YEI) and to strategies of the city of Gonesse (inclusion and youth policies).

In terms of support to the EUP DAE's objectives, the ICT axis of the regional OP aims at **developing new services and products using digital technologies**, as well as coworking spaces. Other priorities do not explicitly target EUP DAE's objectives, but ICT are pervasive in the different fields of actions (e.g. the use of ICT for training programmes, as seen previously). The local ITI is still in the process of consolidation, mainly through the realisation of flagship projects. Its digital priority will contribute to the EUP DAE's objectives regarding innovation (through its economic development linkages) and of inclusion and skills. Thus, it is clear that in

¹⁹ These Ex Ante Conditionalities (EXAC) are key elements in the 2014-2020 programming period of Cohesion Policy. They 'ensure that the necessary conditions for the effective and efficient use of ESI Funds are in place', in particular in terms of policy, strategy, regulatory frameworks and administrative capacities. See http://ec.europa.eu/regional_policy/en/policy/what/glossary/e/ex-ante-conditionalities .

²⁰ This regional strategy for growth, employment and innovation includes measures to support both the ICT sector and the digital transition of other sectors and society. The region has the political ambition of becoming Europe's 'first smart region'.

²¹ This regional strategy analyses the situation of broadband networks and proposes actions to reach universal ultra-fast internet access by 2020 (consistent with the Digital Agenda's objectives): definition of responsibilities of the different stakeholders, monitoring of the private companies and public support for complementary measures.

both the regional and local strategies, **ICT are seen both as a sector to develop and as a horizontal priority useful to fulfil other goals and policies (e.g. inclusion, training).**

The governance aspects of the strategies are principally marked by an experimental (ongoing) approach. Indeed, the **ITI and its related Integrated Urban Strategy have been acting as a catalyser to foster project-based planning, transversal cooperation and linkages between stakeholders** on a newly formed territory (CARPF). This process was facilitated by the existing experience with European projects, derived from the PLIE (an employment instrument benefiting from the YEI) and the 2007-2013 Integrated Urban Programme. However, the **administrative burden connected to the ESF** were perceived as an issue for the beneficiary (city of Gonesse). Regarding ICT expertise, the local stakeholders benefit from a long-lasting support to digitalisation and the mobilisation of external expertise when required.

2.3 Main features of the selected project

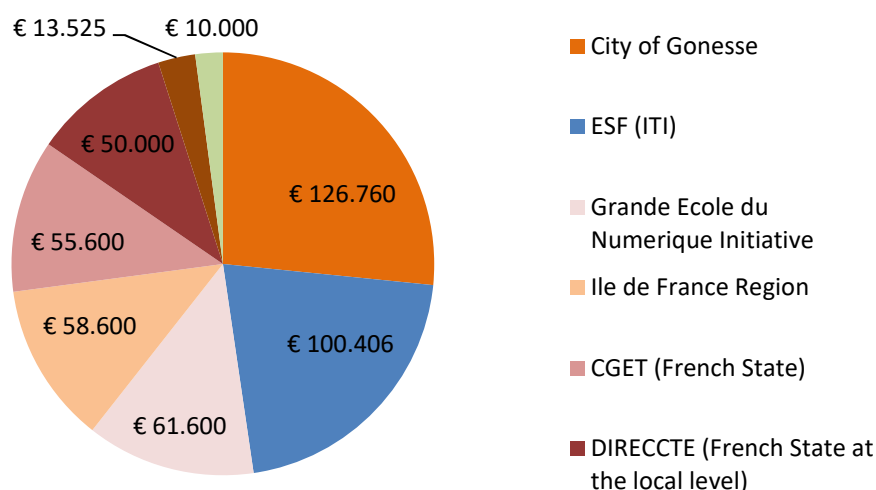
2.3.1 Description

The *Fabrique du Numérique* is a 'social fablab' aiming at fostering young school drop-outs' inclusion by using ICT. As such, **ICT are seen as a means to boost youth self-esteem, skills and remobilise them in a long-term perspective, such as continuing further training or joining the labour market.** Concretely, 12-15 youth are following a 430-hour training during 5.5 months in an equipped fablab located in the Marc Sangnier social centre (Gonesse). The design of the project implied feasibility studies in 2013-14, with operations on the ground starting in 2015.

The **project leader is the city of Gonesse, with the help of several partners.** On the ground, two stakeholders design and implement the project on behalf of the city of Gonesse: "Co-Dev", an NGO, and "Ensemble Communications Participatives", an enterprise (5-6 persons active in the fablab to run the project). In terms of final beneficiaries, the project focuses on the local youth (16-25 years old) who dropped from school. The project supports *promotions*, i.e. groups of 10 to 15 youth for about 5.5 months. 50% of the members of these groups should come from the city of Gonesse itself. *De facto*, this ratio is not attained as the project has a larger catchment area. The final beneficiaries are identified by the local social and employment services (e.g. *Mission Locale, Pole Emploi, etc...*) and by specifically-tailored communication campaigns.

The project relies on **several sources of public funding** (e.g. subsidies, call for tenders, experimentation funds, etc.), especially from the city and the Region since its inception phase in 2013-2014 (feasibility studies, investments for high-quality equipmen amounting to several EUR 100 000s). For the 2015-2017 period (after the start-up costs), the funding structure for the total budget of EUR 476 491 was the following:

Figure 5. 2015-2017 funding sources for *Fabrique du Numérique* (EUR)



Source: Authors based on data from several Region/city documents.

Thus, the **ESF covers more than 21% of funding** for that period, second only to the city of Gonesse (27%). Most expenditures (about 75%) were dedicated to Human Resources during that period.

The project adopts **an innovative mode of delivery**, combining social and digital innovation. The pedagogical approach is 'agile' and project-based, with trainees tackling real-world problems submitted by partners (mainly the city of Gonesse and other public institutions, e.g. creating signs for the local hospital). The fablab team is helping the trainees to acquire both technical (e.g. 3D printing, modelling, social network, cartography) and general skills (e.g. peer-learning, motivation and perseverance) to fulfil the projects' requirements. These concrete projects are complemented with workshops and seminars aimed at building up self-confidence and personalised projects for the involved trainees. The trainees must create an individual portfolio of projects during the 5.5 months, with a final presentation in front of a jury to ensure the acquisition of key skills. Social support is also a vital feature of the project, as the target group is composed of vulnerable youth, who can typically face substantial personal or financial problems. A follow-up of the youth is planned up to 6 months after the end of the training.

Important autonomy is given to the stakeholders implementing the project on the ground (Co-Dev and ECP), with the city of Gonesse acting as a coordinator for both practical issues (e.g. specific purchase) and networking needs (with economic, cultural or social stakeholders active on the territory).

2.3.2 Project cycle

Political will was the decisive factor for the emergence of this project. Indeed, the mayor of Gonesse decided to create the *Fabrique du Numérique* after a visit to a similar project in Montréal, Canada (CyberCap, founded in 2000). The city of Gonesse first requested a feasibility study in 2013, realised by external consultants. After this study and additional internal work, the city started a call for tenders in 2015 to select stakeholders who could adapt and reproduce the concept in the context of Gonesse. Co-Dev and Ensemble Communications Participatives applied to the call for tender as a *groupement solidaire* (integral grouping) and were selected by the city with Co-Dev as representative and ECP as co-contractor. The commercial offer was set for a 4-year period, with tacit renewal each year. These stakeholders have designed the pedagogical approach and implemented the project on the ground since 2015. Co-Dev is primarily focusing on activities involving a technical dimension (e.g. 3D printing, programming), while ECP is dealing with activities related to media/communication

(e.g. social networks) and with the social support of the youth. Another call for tender was launched by the city of Gonesse to acquire the relevant equipment for the fablab (3D printer, electronic material, etc.), with support from the *groupement's* technical expertise and to be in line with the pedagogical approach.

Since the beginning of the project, Co-Dev and ECP had to adapt to the emerging difficulties. Indeed, and because of its specific social context, this intervention implies a **constant adaptation of the approach to each new group of youth** (*promotion*), based on group dynamics and specific individual needs (e.g. dyslexia, significant social problems). The team also had to find a balance between the need for long-term effort and short-term satisfaction to maintain the motivation of the youth in the project. Additionally, Co-dev is conducting in-house research projects to improve the efficiency of its pedagogical intervention (e.g. impact of digital fabrication on the ability of trainees to persevere).

The expected results are the **acquisition of general/technical skills and a remobilisation for a personalised long-term project** (mainly training) for the youth benefiting from the project. It translates into a(n) (indicative) goal of 50% of the youth in training one month after the end of the programme. On a more strategic perspective, the project is also expected to **contribute to the emergence of an Integrated Urban Strategy** and to favour cooperation between local stakeholders. Direct employment is not the primary goal of the project, in spite of being considered as a contributor to the Specific Objective 8 of the OP ('Increasing the employability and skills of unemployed Ile-de-France citizens'). For the different *promotions*, positive trajectories represent about 80-90% of the youth, with 70% re-joining the training system and 20% accessing the labour market directly. According to the project managers, similar projects typically yield a success rate of 40%. In line with the pedagogical approach (focused on remobilisation), the former trainees are conducting both digital and non-digital related activities after the programme. These results can lead to outcomes such as reduced unemployment and exclusion under certain conditions (e.g. skills developed, the existence of specific opportunities).

The **achieved results are recognised as particularly good given the specificities of the target group**. It was granted the '*Grande Ecole du Numérique*' label (certification of the Ministry of Education for digital training), after an application of the city. Similarly, it was selected as a URBACT good practice after an application of the CARPF. These valorisation activities could be further extended in the future through an application to the URBACT TRANSFER call²².

In terms of sustainability, the future of the project would depend on several factors, notably agreement on the adequate level of territorial intervention and funding. **Cohesion Policy support allowed an increased scope for the project, in a complementary approach with other funds available to French local authorities.**

2.3.3 Contribution to the strategy in place and the Digital Agenda for Europe/Digital Single Market

This project mainly **contributes to the local digitalisation and inclusion strategies**, as expected. Its **impact is mostly local**, given its scale and focus on a qualitative (high success rate) rather than a quantitative perspective (number of persons trained). It is **strongly aligned with the territorial needs identified in local and regional diagnoses**. This initiative also contributes to a more general rise in awareness of the potential of ICT for social policies, inclusion and training. As the interest for the use of ICT to pursue inclusion objectives

²² URBACT transfer networks allow the adaptation and re-use of successful initiatives from 'Good practice cities' to 'Transfer cities' in the EU.

is growing, it is useful to distinguish between different types of strategies²³, based on their focuses and objectives:

- **Highly competitive ICT specialists' training:** this model proposes free (or near-free) training to people with no (or few) requirements in terms of formal education. It is highly competitive and aims at excellence and work placement as elite ICT specialists. The social dimension is due to the economic model. A significant example is 42 in Paris²⁴: an elitist (yet free and without diploma conditions) project-based training curriculum to become software developer funded by Xavier Niel, a French billionaire of the ICT sector.
- **Social ICT specialists' training:** this model ensures a free (or near-free) training targeting people in particular social situations and with limited formal education. It is less competitive than the previous model, yet aims at allowing access to ICT positions (at different levels). Simplon²⁵ is the prime example of this model: free training without diploma conditions to acquire the basics in web development/data analysis. It primarily targets disadvantaged and underrepresented groups (e.g. women, refugees)
- **Social training using ICT:** this model provides free training for people with specific social needs and lacking formal education. The main aim is not to train ICT specialists, but rather to use ICT as a pedagogical and remobilisation tool. The *Fabrique Numérique de Gonesse* can be considered as part of this category.

At the regional level, the action mainly contributes to the 'Reduce the number of drop-outs during training and education' dimension of the Specific Objective. For the first three *promotions*, it led to 44 youth following some form of training after the programme (e.g. internships, secondary, post-secondary or tertiary education).

At the European level, the project contributes to the realisation of the digital inclusion and training objectives of the DAE.

2.3.4 Success factors, limitations and other issues

The following success factors contributed to the results of the project:

- **An important political will** to support an innovative project aiming at tackling school drop-outs through ICT;
- An inclusion and **contribution to integrated local, regional and European strategies**, mobilising both relevant stakeholders and sources of funding;
- A **previous experience with European funds** and complex financial arrangements;
- An **adapted (and continuously refined) pedagogical and social approach**, benefiting from **relatively high financing per trainee** and complementary competencies within the project's team;
- A strong effort of **communication**, for instance through the *Grande Ecole du Numérique* and URBACT labels.

Cohesion Policy support contributed to the development of a new governance system in the context of the administrative reforms that led to the creation of the CARPF. It **consolidated the strategic approach to digitalisation, economic development and inclusion, and helped local stakeholders to adopt a project-based, transversal approach**. Structural Funds are overall deemed adapted to support innovative projects. However, the **ESF framework has led to significant administrative burden** for the beneficiary.

²³ Ad hoc typology developed using the ongoing projects in the Ile-de-France region (grey literature, interviews of the case study).

²⁴ For details, see: <http://www.42.fr>

²⁵ For details, see: <https://simplon.co/qui-sommes-nous/>

In order to be further consolidated, the following points would have to be addressed:

- At the EU level, a reflection on some ambiguities triggered by the horizontal dimension of ICT. For instance, **digital-related Ex Ante Conditionalities are not highly relevant to eInclusion projects**. Moreover, linking an eInclusion project to specific budget lines (e.g. digital investments, training, inclusion...) can lead to uncertainties.
- A **clarification of the expected scale and territorial reach** of the project (city of Gonesse, CARPF), especially in the context of the emerging Urban Integrated Strategy;
- A consolidation of the **links with some stakeholders and other relevant projects** on the territory (especially for those who do not have a solid experience with ICT and its potential for inclusion projects);
- A reflection on the **economic and organisational model in the medium-term** (role of subsidies and other sources of funding).

2.4 Conclusions and lessons learnt

This eInclusion project demonstrates the potential of ICT to achieve social and educational goals, provided that **sufficient political support, resources and staff are allocated** to this end. This ambition is clearly formulated at the regional and local levels. Several lessons can be drawn from this experience, with particular relevance to the future of Cohesion Policy. Regarding the framework of Cohesion Policy, this project reveals some **difficulties and ambiguities linked to the horizontal dimension of digital investments**. For instance, the Ex Ante Conditionalities related to ICT are not of high relevance for this kind of intervention. It can also lead to **difficulties in connecting eInclusion projects to specific budget lines**, as they can be considered as digital, social or training projects. Lifting such ambiguities could **favour an integrated approach to digital investments**. In spite of these limits, Cohesion Policy can still provide a **critical contribution to the success of eInclusion projects**, as demonstrated by the experience of the *Fabrique du Numérique*. **Cohesion Policy favours the ongoing emergence of a local digital strategy and the consolidation of partnerships between local stakeholders** at the CARPF level, in particular thanks to the ITI. Partnerships are a decisive factor of success for eInclusion initiatives, because they require cooperation between services and stakeholders that are not always used to cooperate.

As eInclusion initiatives become more common in public policies, **the issues of the specific goals and target groups have to be addressed**. Indeed, several approaches are possible (see 'Contribution to the strategy in place and the Digital Agenda for Europe / Digital Single Market' for existing initiatives), and need to be in line with the project's objectives and target groups (e.g. a remobilisation project would not require the same resources and yield the same results as an initiative to train ICT specialists). The use of **experimentation and constant adaptation** of the pedagogical and social approach seems to be decisive. In this context, Cohesion Policy can provide a **framework for exchanges of experience and diffusion of good practices**, securing benefits in the wider context. It is for instance demonstrated by the URBACT good practice label awarded to the Fabrique du Numérique.

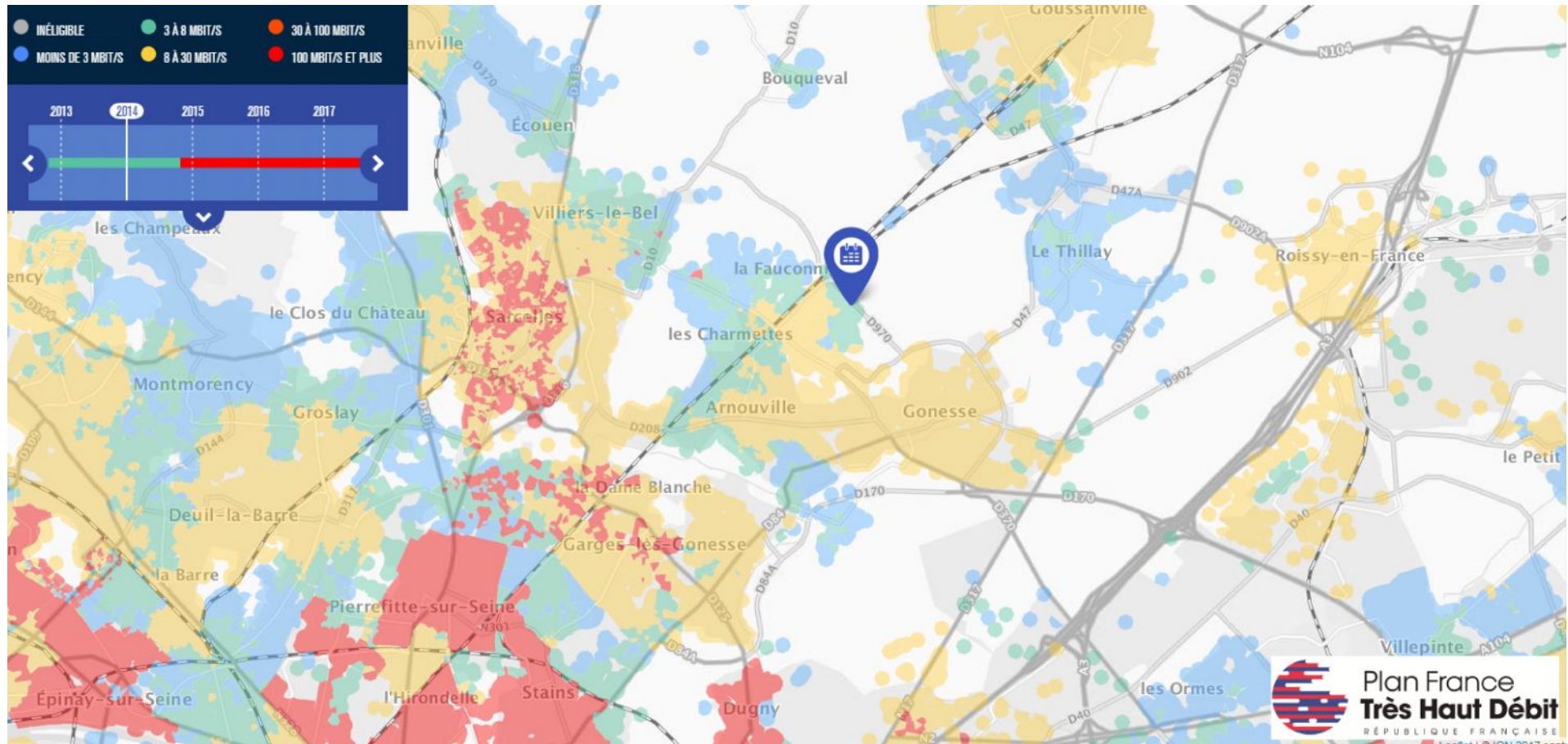
2.5 Appendix

Map 2: Gonesse within Ile-de-France (Paris Region)



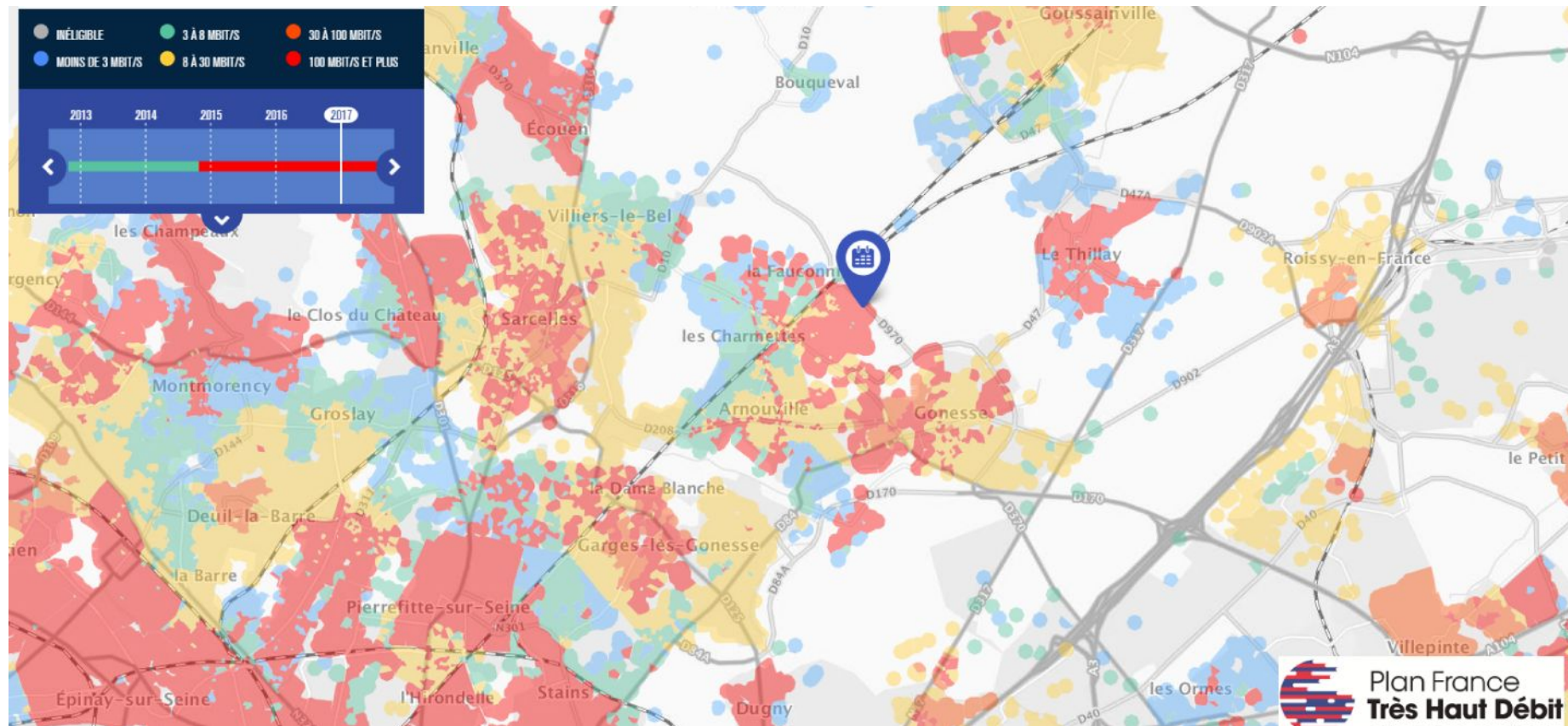
Source: La Dépêche (2013).

Map 4: Internet access speed in 2014 (Gonesse and CARPF area)



Source: Observatoire Très Haut Débit (2017), Observatoire - France Très Haut Débit.

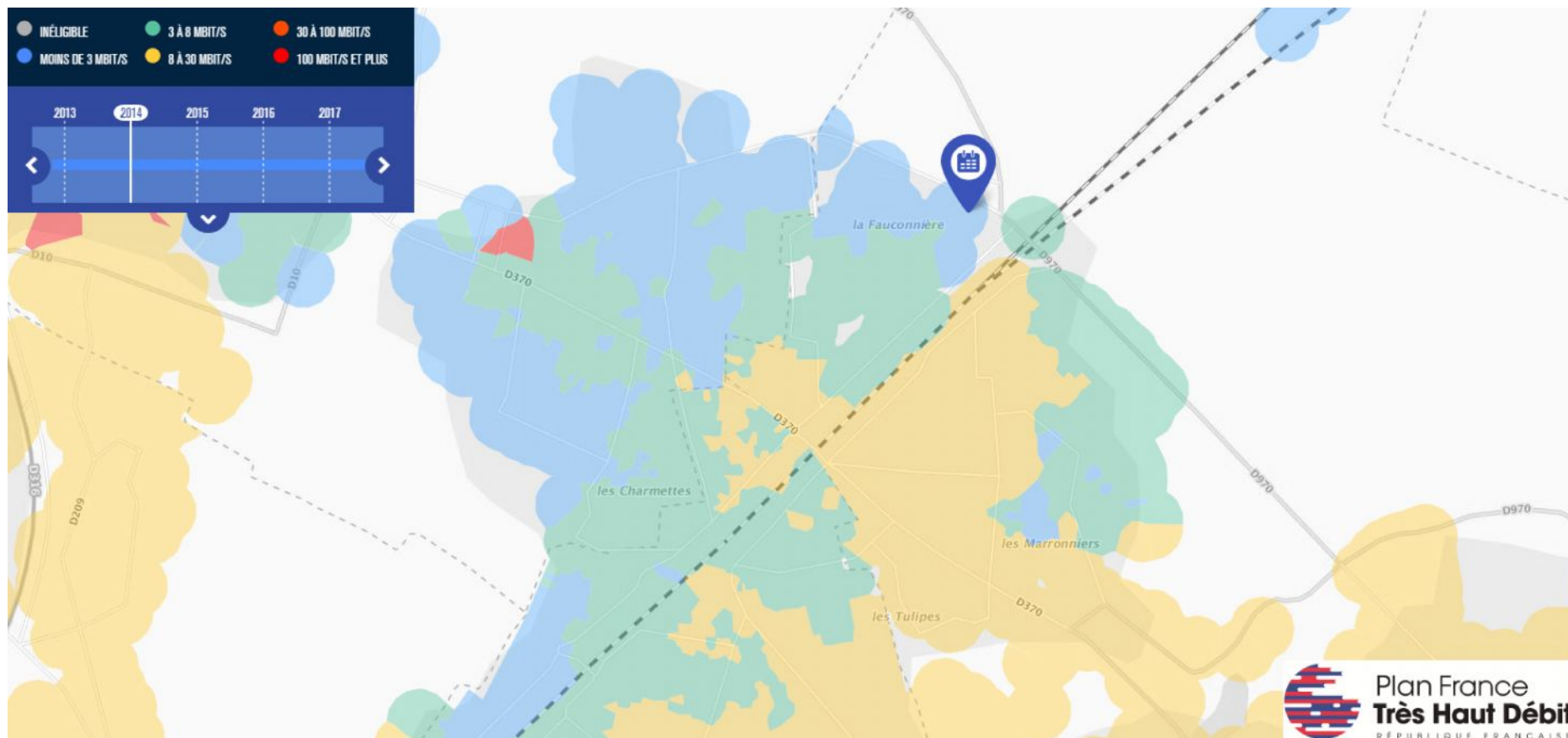
Note: Colours correspond to local internet speed: blue – less than 3 Mbit/s; green – 3 to 8 Mbit/s; yellow – 8 to 30 Mbit/s; orange – 30 to 100 Mbit/s; red – more than 100 Mbit/s.

Map 5: Internet access speed in 2017 (Gonesse and CARPF area)

Source: Observatoire Très Haut Débit (2017), *Observatoire - France Très Haut Débit*.

Note: Colours correspond to local internet speed: blue – less than 3 Mbit/s; green – 3 to 8 Mbit/s; yellow – 8 to 30 Mbit/s; orange – 30 to 100 Mbit/s; red – more than 100 Mbit/s.

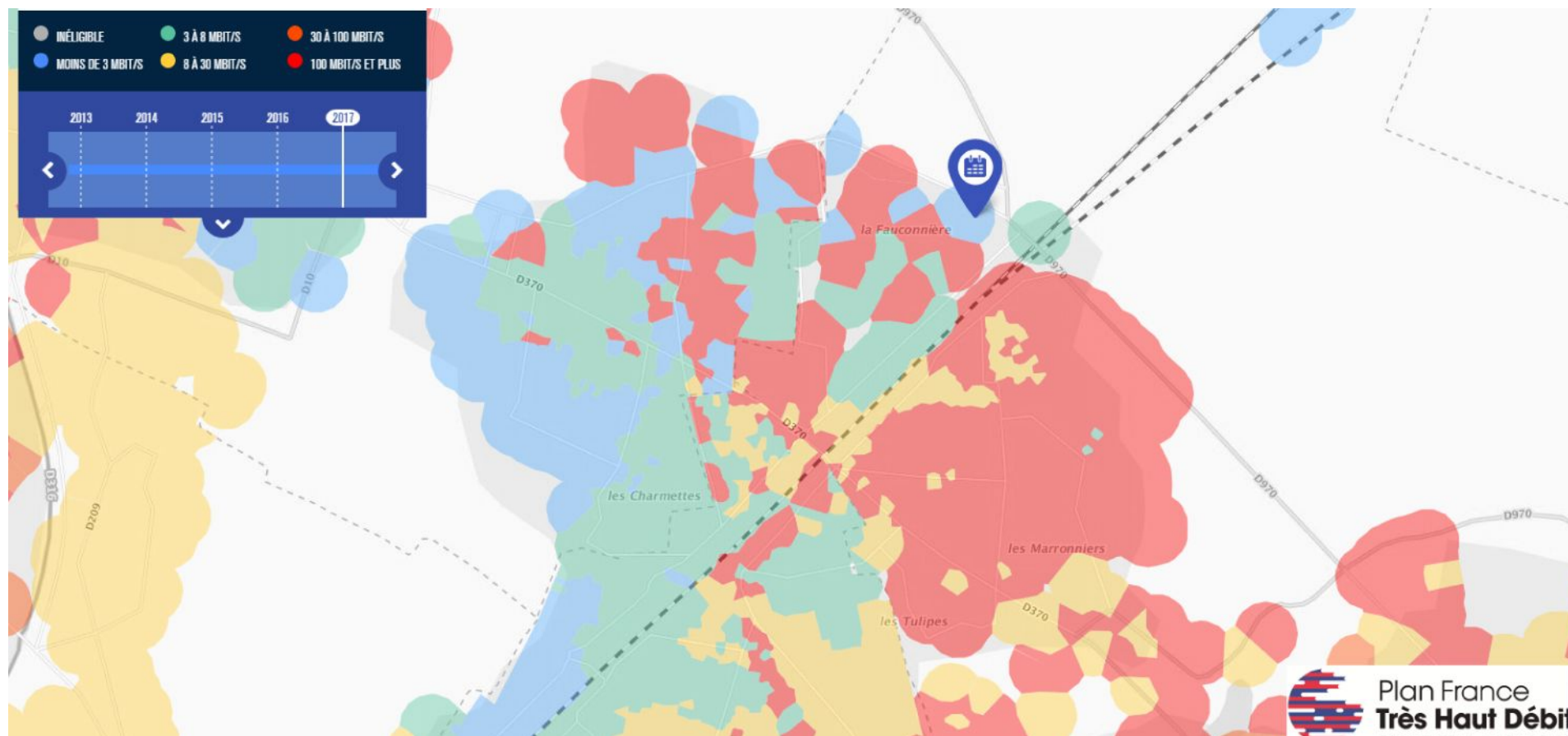
Map 6: Internet access speed in 2014 (Focus on the Fauconnière Neighbourhood)



Source: Observatoire Très Haut Débit (2017), *Observatoire - France Très Haut Débit*.

Note: Colours correspond to local internet speed: blue – less than 3 Mbit/s; green – 3 to 8 Mbit/s; yellow – 8 to 30 Mbit/s; orange – 30 to 100 Mbit/s; red – more than 100 Mbit/s.

Map 7: Internet access speed in 2017 (Focus on the Fauconnière Neighbourhood)



Source: Observatoire Très Haut Débit (2017), *Observatoire - France Très Haut Débit*.

Note: Colours correspond to local internet speed: blue – less than 3 Mbit/s; green – 3 to 8 Mbit/s; yellow – 8 to 30 Mbit/s; orange – 30 to 100 Mbit/s; red – more than 100 Mbit/s.

2.6 List of interviews

INSTITUTION/ENTITY	ROLE	DATE OF THE INTERVIEW
CARPF	European funds manager (coordinator ITI/PLIE)	12/02/2018
Co-Dev	President of Co-dev	13/02/2018
Co-Dev	Fablab manager	13/02/2018
City of Gonesse	Youth policy officer, coordinator for <i>la Fabrique du Numérique</i>	14/02/2018

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3. EAFRD SUPPORT TO IRRINET (EMILIA ROMAGNA, ITALY)



3.1 Introduction

This case study concerns an EU-funded subsidy to the users of IRRINET/IRRIFRAME, a software for irrigation efficiency. This subsidy – which amounts to EUR 15/ha – is included in the Rural Development Programme 2014-2020 in Emilia Romagna, co-funded by EAFRD funds. This measure is integrated as a mutual commitment, and applicants are eligible to obtain the subsidy provided that they comply with Integrated Production and Organic Farming requirements. It is worth noticing that the object of the case study is not the project IRRINET/IRRIFRAME itself: its development and design were not supported by EU funds, and it has always had regional roots. On the other hand, it is interesting that both the Managing Authority and the EU Commission understood the potentialities of IRRINET/IRRIFRAME by including it in Rural Development Programme. Indeed, this case study provides insights on how Cohesion Policy can contribute to the Digital Agenda's objectives by supporting an already existing ICT tool. In particular, the subsidy to IRRINET users is interesting because:

- It shows an example of **innovative digital tools in agriculture**. The EU subsidy aims at encouraging the use of IRRINET/IRRIFRAME in local farms.
- It is **an incentive to digitalisation in the agriculture field**. By supporting the use of IRRINET/IRRIFRAME, the subsidy has an important educational value as it increases digital awareness.

3.2 Strategic and policy framework

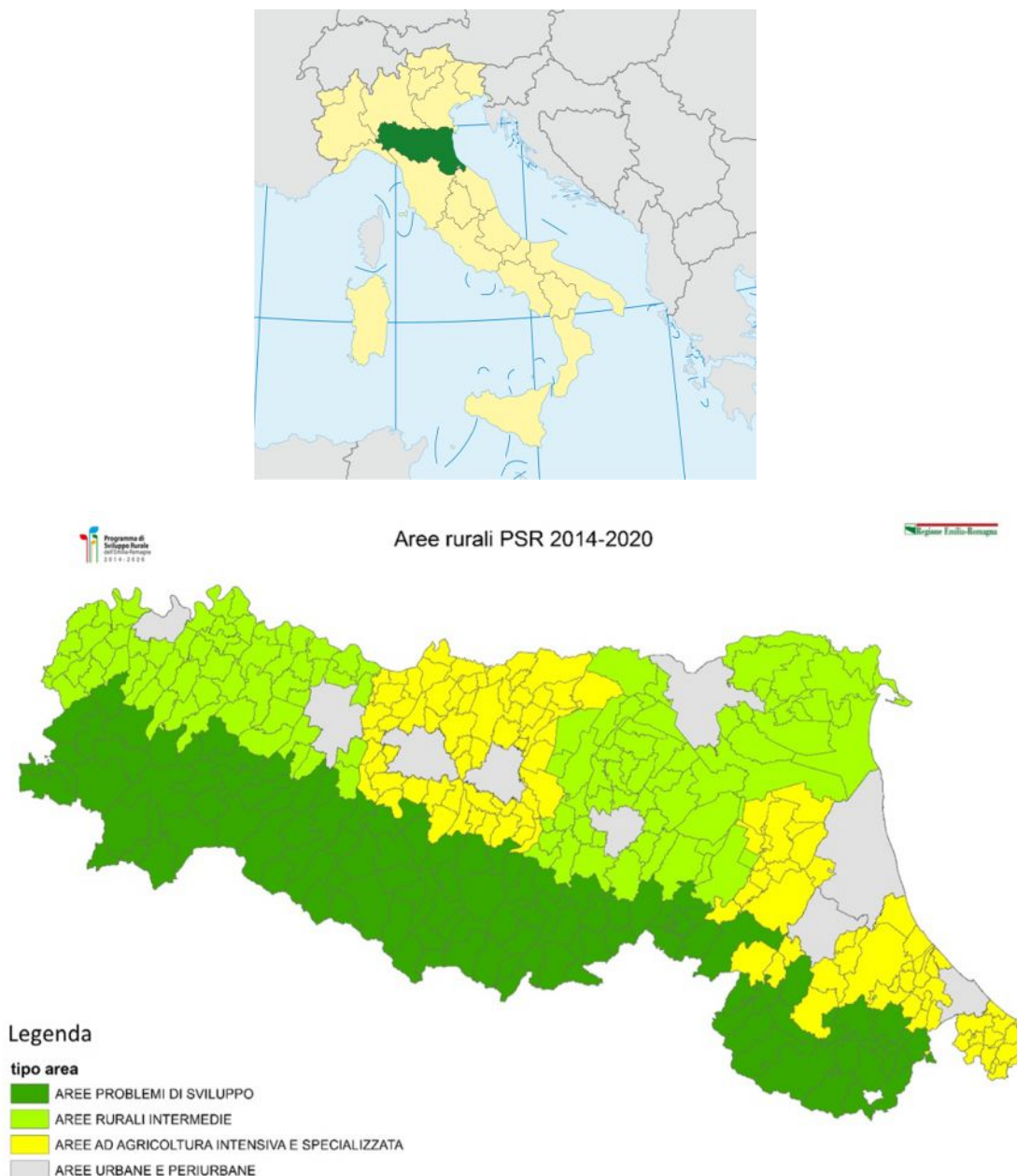
3.2.1 Territorial needs

Emilia Romagna is located in the Northeast Italy, with a population of 4.4 million inhabitants. According to EUROSTAT²⁶, most of the provinces (NUTS3) in Emilia Romagna are defined as intermediate between urban and rural areas. In 2012, 56.5% of total population was living in an intermediate area²⁷.

²⁶ Eurostat (2017), *regional digital statistics*.

²⁷ Based on the Rural Development Programme of Emilia Romagna. Intermediate areas include: 'Rural Area type B', 'Extensive Agriculture Areas', 'and Intermediate rural areas'.

Figure 6. Emilia Romagna in Italy; Emilia Romagna rural-urban areas.



Source: Authors (map of Italy) and Regione Emilia Romagna (map of Emilia-Romagna, legend: Green: Rural Areas; Light Green: Intermediate Rural Areas; Yellow: Extensive Agricultural Areas; Grey: Urban Areas).

Emilia Romagna is the fourth Italian Region per GDP (EUR 153 927 million in 2016), contributing to 9% of the national GDP²⁸. According to Eurostat (2015), GDP per capita was 19% higher than the EU27 average. Thus, Emilia Romagna has been included in the 'more developed regions' for the programming period 2014-2020. With 1.7% GDP growth in 2017, Emilia Romagna outperforms the National average (1.5%), and it is the fastest-growing region in Italy. Unemployment is significantly below the national average (6.3% vs 11.3%). According

²⁸ ISTAT (2016).

to Unioncamere estimation, Emilia Romagna GDP in 2018 should reach the pre-crisis level (2007), thus achieving the full economic recovery while Italy is still struggling²⁹.

The economic context is characterised by a **predominance of small and medium size Enterprises (SMEs)**: over 99% of total enterprises located in the region (408 000 in 2017) have less than 50 employees³⁰. The **agricultural sector is strong** (see Box 4 below), as the region is worldwide known for its PDOs and PGI³¹ products (more than 42% of the Italian turnover from quality agricultural product is generated in the region). The secondary sector is led by the export-oriented manufacturing industry. The region is characterised by industry clusters (such as the car industry) belonging to traditional sectors, but able to express an innovative drive³². The services sector is well developed, with a particular focus on tourism in the coastal areas. Another original aspect of the region is the vast presence of co-operative economy, in the agro-food, construction, logistics, retail, social economy, but also with successful manufacturing cases.

Box 4: Key indicators of the agricultural economy in Emilia Romagna (2015-2017)

- Primary sector contribution to gross value added (GVA): 2% of total
- Number of agricultural holdings (no): 74,516
- Average farm extension: 15 ha
- Average livestock units per farm: 15.5
- Number of employees in the food-farming sector: 140,000 (9% of total regional workforce)
- Agricultural area (UAA): 1.1 ha million (ha) – 47.4% of total territory.
- Cereals: 427,422 ha – 42% of total
- Fruit crops: 67,454 ha – 6% of total
- Grapevine for vine production: 55,299 ha – 5% of total
- Vegetables: 55,626 ha – 5% of total

Source: ISTAT (2017), Unioncamere (2016), and RDP Emilia Romagna (2015).

- *Irrigation in Emilia Romagna*

Given the relevance of the agricultural sector in the region, **water resource management had always been crucial both for farmers and policymakers**. In Emilia Romagna, the total irrigated superficies amounted to 260 095 Has in 2010 (ISTAT). According to the Ministry of Agriculture, 11.76% of used agricultural areas (UUA) and **33% of regional farms land is irrigated** (roughly 24 000 farms)³³. Irrigation in Emilia Romagna is mainly based on highly efficient systems, covering 83% of irrigated land (highly above the Italian average of 58%)³⁴. The most used irrigation systems in the region is sprinkler (59% of the total irrigated land), followed by micro-irrigation (24%), furrow and border irrigation (12%) and submersion (3%). According to ARPA Emilia Romagna (2010), fresh water is relatively abundant in Emilia Romagna. However, a drastic reduction in rainfall (especially during the summer) had led to episodes of significant water shortages. Relying on ARPA estimation, the northern areas (provinces of Parma and Piacenza), as well as southern areas (province of Rimini), are under

²⁹ Unioncamere (2018), *Scenario Emilia – Romagna (Previsione Macroeconomica a medio termine)*.

³⁰ Unioncamere Emilia-Romagna (2017), *Rapporto 2017 Sull'Economia Regionale*.

³¹ PDO: Protected Designation of Origin; PGI: Protected Geographical Indication. For further information https://ec.europa.eu/agriculture/quality/schemes_en

³² Financial Times (2017), *Europe's innovation comeback: Emilia Romagna leads Italy back*.

³³ European Network for Rural Development (2015).

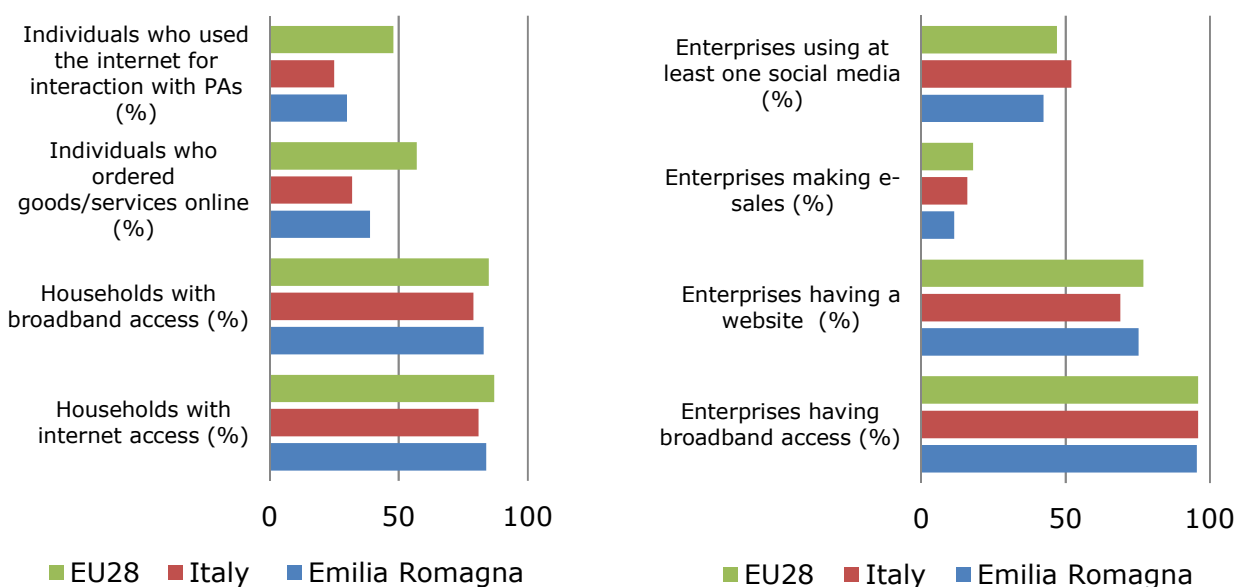
³⁴ Rural Development Programme Emilia Romagna (2014-2020), *IRRINATE - IRRIFRAME - Sustainable irrigation management*.

at high risk of severe drought (see Appendix). On the other hand, surface water is more abundant in the north-west side of the region (called *Emilia*), while in the south-east side (called *Romagna*) it has always been limited (see Appendix). In this context, **the Canale Emiliano Romagnolo (CER)** operates as the **largest water project in the area**, ensuring water supply for the provinces of Bologna, Forlì, Rimini, Modena, and Cesena. The CER also carries out significant research and development activity aimed at improving water management and quality.

- *Overview of digitalisation level in Emilia Romagna*

According to Regional Innovation Scoreboard (2017), Emilia Romagna is considered as **Moderate + Innovator** with an overall Regional Innovation Index of 0.363. This score places Emilia Romagna above the national average, but significantly below the EU one. In addition, the innovation performance has decreased over time, as it was 0.370 in 2011. Figure 8 shows selected digitalisation and innovation indicators.

Figure 7. Selected digitalisation indicators (2017)



Source: ISTAT and EUROSTAT (2017).

As Figure 7 shows, Emilia Romagna usually outperforms Italian average (especially for individuals and households statistics), yet remaining significantly below European values. Italy is a notable underperformer in the digitalisation fields. This lagged-behind environment makes a stand out fairly innovative regions such as Emilia Romagna. Yet, there is substantial **room for improvement** in addressing the digital divide. Some peripheral areas still lack basic internet connection (<Mb/s) while only 9% of the region is covered with broadband over 30 Mb/s. Enterprises are still struggling to exploit the ICT potential. For instance, only 11.9% of businesses in Emilia Romagna make e-sales, which is far behind the EU 2020 objective (33%). ICT penetration is particularly weak in the agricultural sector, as only 30% of agricultural land is managed by enterprises using ICT technology. This figure decreases to 15% in the rural and mountain areas³⁵.

³⁵ ISTAT (2010).

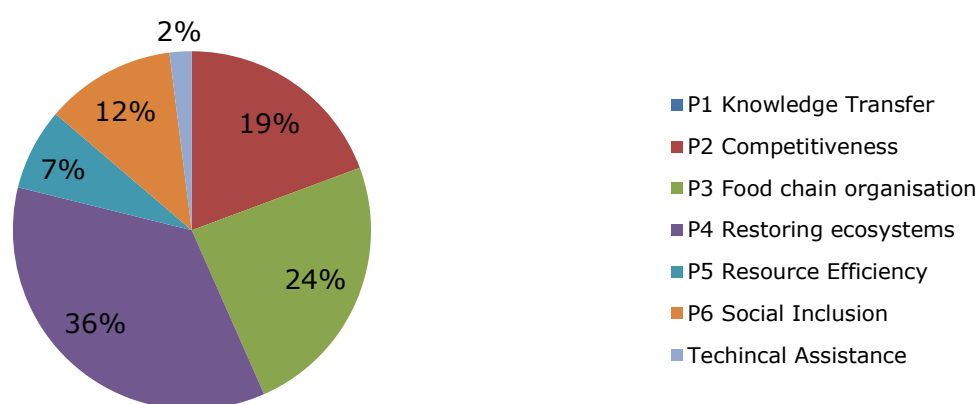
3.2.2 Local strategic and policy context

- *Overview of policy context: Rural Development Programme – Emilia Romagna*

The EUR 15/Ha subsidy to IRRINET users is included in the **Rural Development Programme – Emilia Romagna which is financed by EAFRD**. The total budget of the programme is EUR 1.19 billion (nearly EUR 513 million from the EU budget and EUR 676 millions of national co-financing).

The Regional Rural Development includes all six common EU priorities. Priority 4 (Restoring ecosystems) and Priority 3 (Food chain organisation) receive the more significant share of total funds, followed by Priority 2 (Competitiveness) and Priority 6 Social Inclusion in rural areas. 7% of funds are allocated to Priority 5 (Resource Efficiency), while P1 (Knowledge transfer) does not receive any direct funds as the expenditure is distributed across other focus areas.

Figure 8. Share of funds per Priority

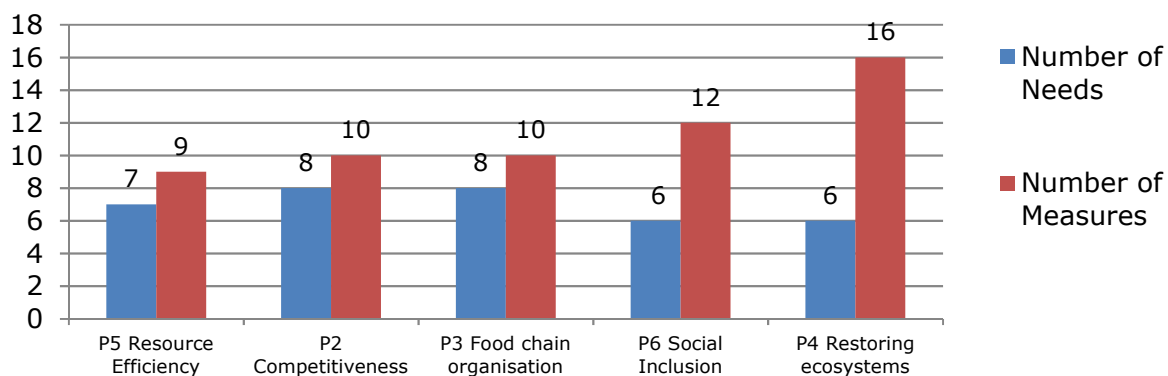


Source: Rural Development Programme Emilia Romagna 2014-2020.

Each priority is further split into more detailed focus areas which include a list of specific needs identified through a SWOT analysis. Examples of these needs are: Support innovation in productivity, Boost integration between R&D, Improve water and energy efficiency, Strengthen collective access to credit. Once these needs are identified, they are addressed with a set of measures³⁶, which include more specific actions. The following Figure 9 presents the number of needs and relevant measures for each priority. An exhaustive overview of the structure of Rural Development Programme for Emilia Romagna is provided in Appendix.

³⁶ The list of measures is set in 'Regulation EU No 1305/2013 of the European Parliament and of the Council'. Those included RDP Emilia Romagna are the following: 01 Knowledge – 02 Advisory – 03 Quality schemes – 04 Investments – 05 Restoring agricultural potentials – 06 Farm/business development – 07 Basic services – 08 – Forest investment – 10 Agri-Environment-Climate – 11 Organic Farming – 12 Nature 2000 and Water Framework Directive (NAT – WFD) – 13 Areas facing natural and other specific constraints (ANC) – 14 Animal Welfare – 16 Cooperation – 19 CLLD or LEADER.

Figure 9. Number of actions and measures per Priority



Source: Rural Development Programme Emilia Romagna 2014-2020.

As Figure 10 shows, P4 'Restoring ecosystems' envisages the highest number of measures addressing six specific needs. Under this priority, Emilia Romagna especially aims at safeguarding water quality and reducing the environmental impact of agricultural activities. P5 'resource efficiency' is quite similar to P4, but it puts more emphasis on the optimisation of water resources, the development of bioenergy and the use of agricultural by-products to minimise climate change effect. P2 'addressing the competitiveness of the agricultural sector' envisages a variety of interventions (ranging from promoting generation renewal to R&D collaboration) which aim to support local farms in the competitive global markets. Some of these interventions are common to those included in P3 'Food chain organisation'. Finally, P6 'Social Inclusion' especially targets local development in rural and deprived areas.

- *The overall logic of intervention and contribution to Digital Agenda for Europe / Digital Single Market*

Unlike ERDF and ESF funded OPs (Operational Programmes), Rural Development Programmes (RDP) lack a priority explicitly mentioning ICT and digitalisation. **ICT and digitalisation are often declined as a horizontal priority, mainstreamed in different measures and initiatives.** ICT are explicitly mentioned only in Priority 6C (included in Priority 6 Social Inclusion) which consists in favouring 'access to and quality ICT'. In Emilia Romagna RDP, this priority mainly tries to reduce the so-called digital divide, especially in the rural areas. The relevant measures include the realisation of optic fibre infrastructure improving the internet services both quantitatively (in terms of coverage) and qualitatively (in terms of speed). This measure is aimed at achieving the Digital Agenda objectives and closely interconnected with the National broadband plan and Regional regulations. Another essential ICT-related measure is the 'improvement of ICT local basic services' included in focus area 6.3. It aims at improving the welfare of the local community and increasing local digital literacy. Particular emphasis is given to rural schools (such as the programme scuola@appenino) and socio-cultural centres. It is worth noticing that measures explicitly citing ICT are mainly addressed to citizens and local community. While ICT are the object of specific measures for citizens, it is primarily a horizontal priority for all measures addressed to enterprises. The subsidy granted to IRRINET users is an example of this horizontal approach. In this case, ICT are used to achieve agriculture- and environmental- related objectives. ICT act as a tool to improve the management and optimisation of resources needed by farms (see next section). The RDP includes other examples of this horizontal approach to ICT as well as a cross-fertilisation between policy fields. For instance, P1 Knowledge transfer also includes training course including ICT skills, as well as the collaboration with innovative R&D centres. The same applies to P2 competitiveness which aims at modernising farms also by increasing their ICT activities.

The Rural Development Programme Emilia Romagna 2014-2020 is managed by the DG Agriculture, Farming and Fisheries of the local Regional Government.

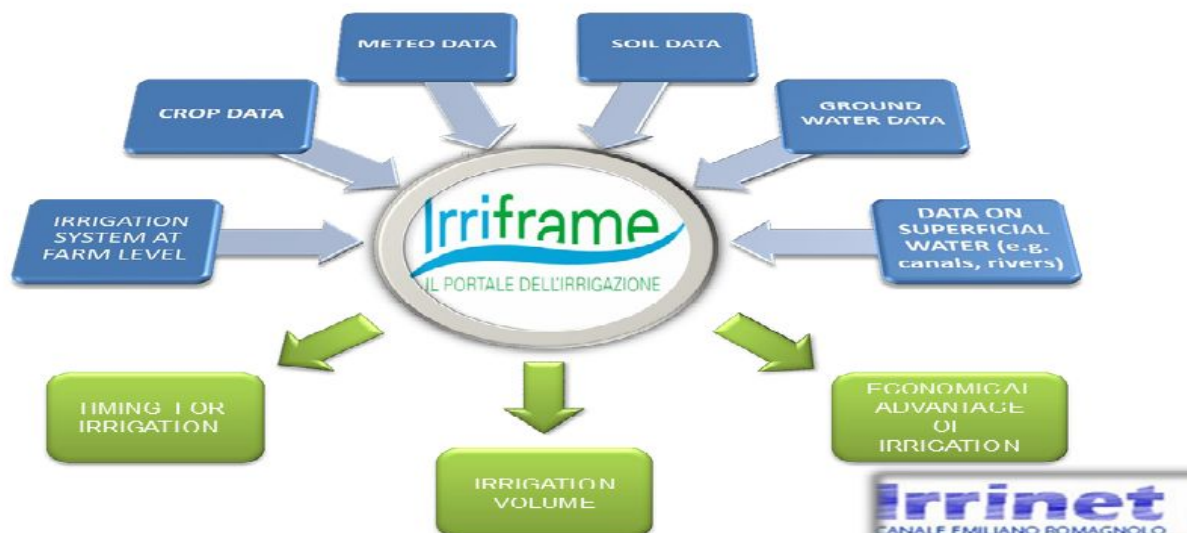
3.3 Main features of the selected project

3.3.1 Description

- *Project Features*

IRRINET is a software **developed** by an IT company (AltaVia srl), thanks to the **knowledge base provided by the CER** (Canale Emiliano Romagnolo) in collaboration with ANBI (Water Boards Italian Association). Since the early 80's, the research and development phase has been co-financed by the Regional Government of Emilia Romagna. IRRIFRAME consists of a set of integrated tools both for final water users (farmers) and for water managers providing extended information on the best water allocation and how to save irrigation water without decreasing the quality of crop production³⁷. IRRIFRAME **combines information from different sources** (such as weather, farm and Geographic Information System - GIS data) with a sound knowledge base (water balance algorithm), and it **makes the irrigation scheduling available on different communication channels like Web, Smartphone and traditional phones**. The output of the system is information on best timing for irrigation, irrigation volume and economic advantage of irrigation. This information is available both as real-time irrigation scheduling for users (such as farmers) and as a big data repository to calculate future water needs of an irrigation district for water managers. Thus, the added value of IRRIFRAME is twofold. On the one hand, **farmers can fully interact with user-friendly software** storing plot geolocation, soil and irrigation system information. On the other hand, **water managers have access to a set of big data** helpful to build short-term scenarios to appraise the evolution of a district's water demand. IRRIFRAME exhibits low management costs, which are supported by the local Water Board and the service is provided free of charge for users. The operating cost of the IRRIFRAME platform is around 0.02€/ha per irrigation seasons. The platform IRRIFRAME is available in most Italian regions.

Figure 10. IRRIFRAME Inputs and outputs



Source: Rete Rurale Nazionale (2014).

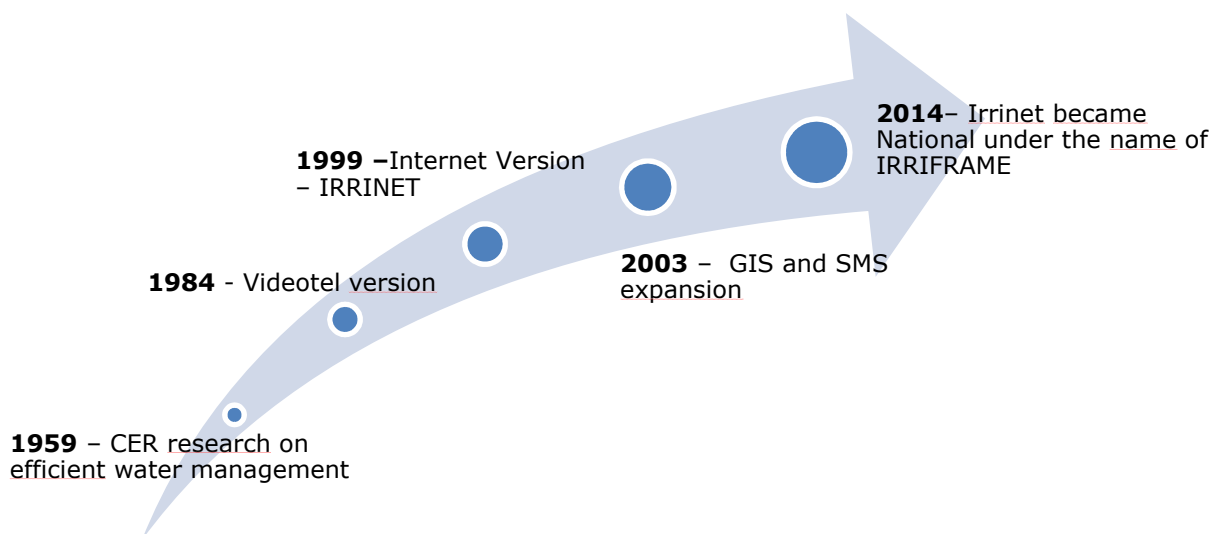
- *Timeline*

The current IRRIFRAME platform traces back its origin in the research activities carried out by the CER in the late 50's aimed at improving water resources management funded by the

³⁷ Giannerini et al. (2015), The Water saving with IRRIFRAME platform of thousands of Italian farms.

National and Regional governments. In 1984, the CER started using Videotel (a centralised information system that predated the Internet – comparable to the French minitel) to provide advisory services on irrigation volumes and scheduling to users. In 1999, the platform was further improved and ported to the internet with the name of IRRINET becoming the world’s first interactive agricultural services online. In 2003, it was integrated with Geographic Information System data and an SMS interface (IrriSMS). **The project was successful as 25% of Emilia Romagna irrigated areas were covered by Irrinet in 2013.** At that time, it was included as a best practice in 2007-2013 Rural Development Programme for Emilia Romagna, as it efficiently supported farmers in water management. In 2014, given its local success, ANBI decided to launch a national version of IRRINET (known as IRRIFRAME) with the technical and scientific support of CER. This version was further improved, including new functions and tools for local farmers and water boards. In 2014, IRRIFRAME obtained the support of the Italian Ministry of Agriculture to extend the platform in new areas as a tool for EU’s rural development policy concerning water management.

Figure 11. IRRINET/IRRIFRAME Timeline



Source: IRRIFRAME website (2018).

- *EAFRD support to IRRINET*

Even though EAFRD did not directly finance the development of IRRINET/IRRIFRAME, it has always supported its use. **The IRRINET software has been introduced in the Rural Development Programme for Emilia Romagna during 2007-2013** programming period as best practice to achieve general objectives related to water resources management. The adoption of IRRINET exempt users to manually compute the water balance³⁸ which defines the amount of waters needed for each crop. By 2013, 3 100 farms, covering almost 25% of the irrigated area in the region were managed using IRRINET³⁹. Given the success, IRRINET was introduced also in the programming period 2014-2020. The first call containing a direct subsidy for IRRINET users was launched in 2016. **The use of the software is included as a supplementary commitment in Measure 10 Agri-Environment-Climate and 11 Organic Farming** that are included in Priority 4 (focus areas 4B and 4C). Also, an indirect contribution is found in Measure 16 Cooperation regarding support to research activities linked to the improvements and updating of IRRINET (see below).

³⁸ In agriculture, water balance is defined as the flow of water in and out of a system. The water balance components can be grouped into components corresponding to zones in a vertical cross-section in the soil forming reservoirs with inflow, outflow and storage of water.

³⁹ Manually computed water balance are often inaccurate.

- *EAFRD financial support*

Measure 10 'Agri-Environment-Climate' (AEC) envisages several interventions aimed at achieving EU priorities related to ecosystems sustainability and resource efficiency. The RDP support to this theme consists in a set financial contributions (in terms of €/ha) to compensate potential lower operative margins caused by agro-environmental commitments undertaken on a voluntary basis and not included in standard compliance. This measure is further split into 10 operations. Amongst these commitments, operation 10.1.A focuses on 'Integrated Production'⁴⁰. This operation boosts the sustainable use of phytosanitary products aimed at preserving biodiversity and water resources. The commitments related to Integrated Production include the irrigation sector boosting the adoption of hydric balances in order to schedule the timing and the amount of the irrigation. **The compliance with the introduction of Integrated Production requirements is a pre-requisite to apply for the 15€/ha subsidy for IRRINET, which is conceived as a supplementary voluntary commitment.** In other terms, it is essential to stick to the whole commitment of undertaking Integrated Production in order to be eligible for the EUR 15/ha grant arising from the use of IRRINET.

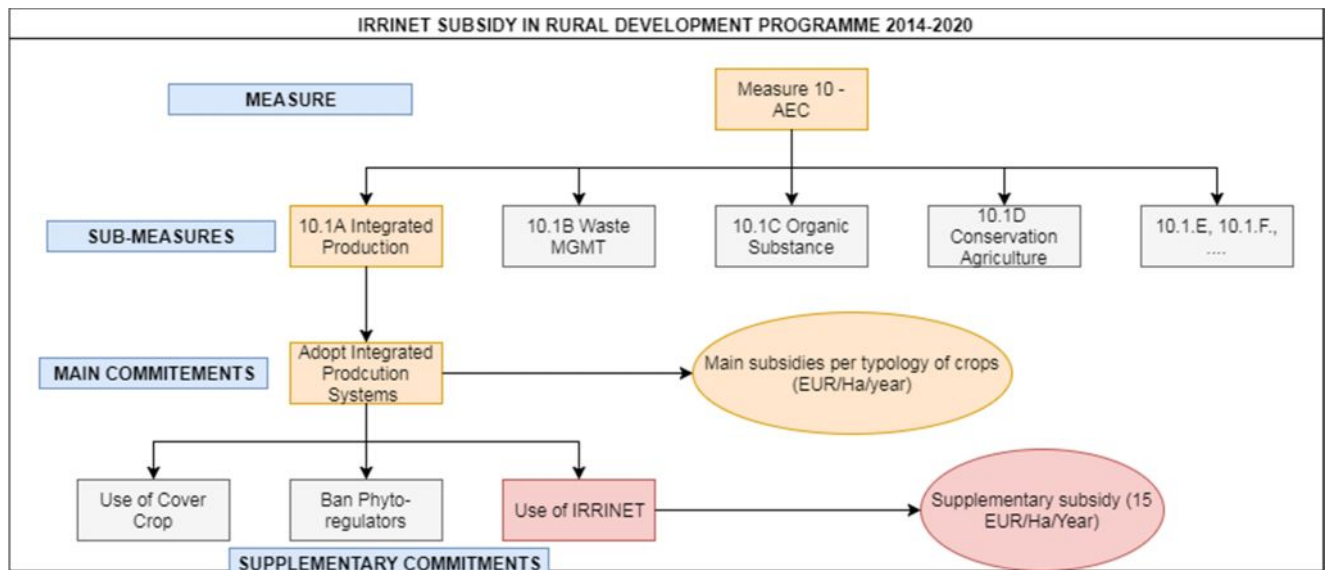
The same logic applies to Measure 11 'Organic Farming', which aims at sustainable and efficient use of resources (water, soil, and land) through the implementation of organic farming technics. Measure 11 is further split in two sub-measures: 11.1A financial support for the transition to organic farming and 11.1B financial support for the maintenance of organic farming. Like Measure 10, it includes a set of incentives (in terms of EUR/ha) to cover the higher maintenance costs related to organic farmers technics which shall be applied to the whole UUA considered eligible for organic farmers⁴¹. The amount of the financial support varies according to the typology of crop or livestock. In case of compliance with the main commitments related to 11.1A 'organic farming', applicants are eligible for a further subsidy of EUR 15/Ha for the use of IRRINET. The rationale for this support is to further motivate farmers to exploit the potential tools provided by IRRINET, and its relatively small financial contribution is explained by the very limited additional costs of using IRRINET⁴². The beneficiaries are active farmers (as per Reg. EU 1035/2013) who respond to tenders for RDP support for the above-mentioned measures. The verification procedure is rather straightforward: the Managing Authority verifies the registration and the adoption directly via web supported by the service provider (CER). If the users did not reach a satisfactory number of accesses, the subsidy might be reimbursed.

⁴⁰ Integrated production is a sort of in-between of traditional and organic farming. It is a typology of agriculture focused on a responsible use of resources and modernization of traditional farming technics in order to improve quality and sustainability.

⁴¹ Council of the European Union (2007), Council Regulation (EC) No 834/2007 of 28 June 2007 on organic production and labelling of organic products and repealing Regulation (EEC) No 2092/91.

⁴² As IRRINET is provided for free, additional costs are considered as the time and effort needed to input the relevant data and set up the programme.

Figure 12. IRRINET SUBSIDY IN RDP EMILIA ROMAGNA 2014-2020



Source: Authors based on RDP Emilia Romagna (2014-2020).

- *EAFRD indirect support to IRRINET*

Besides the above-described subsidy for the use of IRRINET within Measures 10 and 11, the **RDP 2014-2020 supports the research activities which are essential to the efficiency of the software**. Indeed, since the very first version of IRRINET, the underlying scientific research carried out by CER had been financed by the Regional Government. The support of European funds is introduced in 2016, under Measure 16.1. **'Support to operational groups in the field of agricultural productivity and sustainability'**, with EUR 12 million budget. These groups shall include business and farms, producers organisations, and research centres. Amongst the main topics to be addressed by these operational groups, particular relevance has been given to the Focus Area 4b 'Improvement of water quality'. The total budget for this focus area is EUR 1 020 000. In 2016, CER has been awarded of EUR 809 575 for five research projects related to these themes. In this framework, **CER carries out two research projects linked to IRRINET**. The first one concerns the automation of the delivering network in irrigation through the estimation of water requirements thanks to IRRINET. The objective of this pilot study is to fine tune the real-time estimation of water needs of areas and to automatize irrigation canal sluices. The second project 'sensors and IRRINET' aim to further integrate the hydraulic balance of IRRINET with meteorological stations and local ground sensors. The objective of this project is to develop software able to automatically integrate real data provided by ground sensors with the IRRINET methodology of water resource management. If successful, these research projects will further strengthen IRRINET potential as a sophisticated ICT tool in agriculture. In addition, it should be noted that eventual intermediate research outputs (such as updated information on water needs per crops, analysis of typology of grounds and so on) are integrated into the current version of IRRINET as updated parameters for the underlying algorithm.

- *Current performance and results*

According to the DG Agriculture, Farming and Fisheries of the local Regional Government, the **IRRINET subsidy has been granted to an additional 11 531 has** (9950 Has for Measure 10, and 1581 Has for Measure 11), **corresponding to almost 300 farms for a total disbursement of EUR 172 965**. It is very challenging to 'isolate' the subsidy effect, as it is supplementary (conditioned to the fulfilment of the main commitments) and limited to specific intervention areas. It is difficult to assess whether the subsidy efficiently attracts more users. According to CER, there are more than 12 000 farms using IRRINET covering more than 100 000 Has of irrigated lands which respectively corresponds to 50% of total farms with irrigation

systems and 40% of the total irrigated lands. This data shows that the IRRINET diffusion in the territory is already consolidated and that only 2.5% of current users received the EUR 15/Ha subsidy.

As to the outputs of the research activities related to IRRINET financed under Measure 16.1, it is likely to bring interesting improvements to the software. In any case, the above-mentioned usage data together with an estimated water saving of 80 million of cubic meter confirm the success of IRRINET as a water management tool. Its national version IRRIFRAME has been presented to EXPO 2015 as an example of innovative technology in the field of agriculture and it is likely to be also applied in other countries.

3.3.2 Contribution to the strategy in place and the Digital Agenda for Europe / Digital Single Market

Concerning the contribution of IRRINET to the local strategic policies and the digitalisation process, it should be stressed **that IRRINET has always had substantial positive educational effects in terms of digital literacy**. For instance, the 1999 web version of IRRINET was the first interactive agricultural service on the Internet. According to the Regional Government, this led some farmers to buy ICT equipment with the main objective of using IRRINET software. Nowadays, its continuing adaptation to new technologies (IRRINET is now available for iOS and Android Smartphones) and its user-friendliness make IRRINET a strong tool of ICT penetration in the relatively hostile sector of agriculture. By using IRRINET, farmers might become familiar with ICT and digital technology and eventually adopt more hi-tech solutions in their business.

The direct impact of the EAFRD subsidy on the digitalisation of farms is likely to be limited. As previously described, IRRINET has a solid uptake, and the subsidy effect is – at best – residual. The small financial contribution only covers the time and effort to set up the software as it is insufficient to meet potential expenditures linked to the acquisition of ICT instruments (such as personal computers, smartphones etc.).

3.3.3 Success factors, limitations and other issues

Most of IRRINET success should be attributed to its ability to turn complex knowledge into simple information. It is a far more efficient alternative to the manually computed water balances, providing more accurate outputs in a shorter time. This generates fewer costs for farmers (in terms of time and water bills) and positive environmental effects (in terms of water savings). According to the experts, its main limitations are linked to technical issues, which might be overcome through further research activities.

3.4 Conclusions and lessons learnt

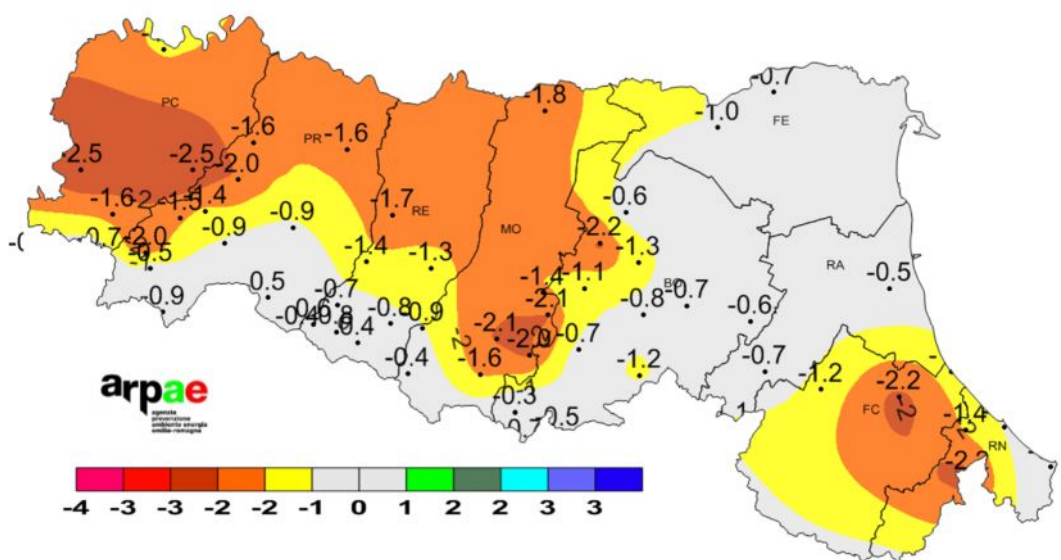
IRRINET has proven to be a successful and widely appreciated tool for water management in agriculture. It represents a best practice of innovative technologies in this field of rural development. The EAFRD support to IRRINET is consistent with the overall logic of resource efficiency, eco-friendly agriculture, and to a lesser extent digitalisation. Yet, the modest financial contribution and relatively late intervention of the EAFRD in the project lifecycle leads to the conclusion that its **support to the broad success of IRRINET is marginal**. One would expect that a higher subsidy and wider inclusion of IRRINET in more measures might increase the effect of EAFRD support. However, a higher financial contribution might be unnecessary considering that IRRINET is already widely used regardless of any support. Perhaps, the major EAFRD contribution to IRRINET is indirect: by financing the research activities, the Rural Development Plan contributes to improve and update the knowledge which is essential to IRRINET success. More generally, this case study suggests that there might be a need to adjust Cohesion Policy's contribution to digital investments in

rural areas. As demonstrated with Emilia-Romagna, there are important gaps with urban areas in that matter, for instance regarding the use of ICT in companies. Addressing these gaps would require a reflection on the best forms and levels of intervention for the EAFRD, considering interactions with other EU instruments (e.g. ERDF for broadband, H2020 for Research and Development).

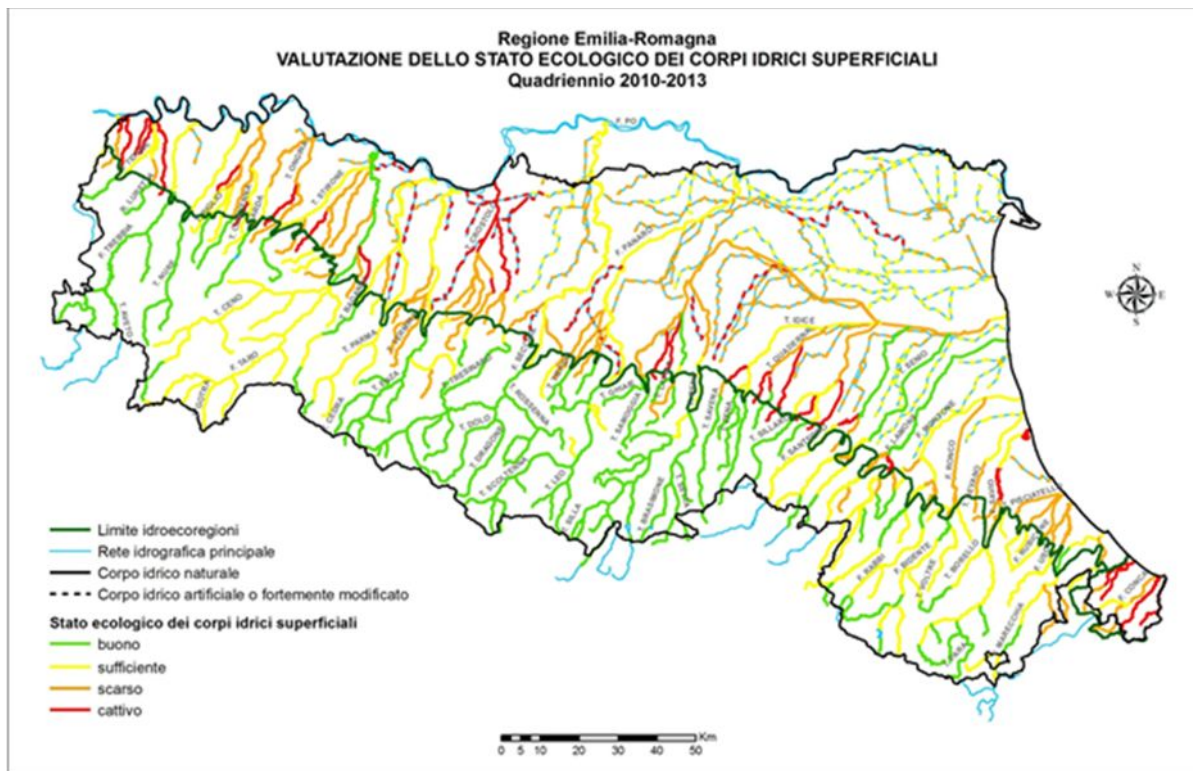
3.5 Appendix

Figure 13.

Standardized Precipitation Index - 12 months - Dicembre 2017



Source: ARPAE (2017).

Figure 14. Ecological status river water – Emilia Romagna


Source: ARPAE (2017).

Note: light green: good quality; yellow: fairly good; orange: poor; red: critical.

Table 2. Rural Development Programme Emilia Romagna (2014-2020)

PRIORITY	SUB MEASURES	NEEDS	TYPE OF MEASURES	TARGET
P1 Knowledge transfer and innovation	1A Fostering Innovation, cooperation, knowledge base	Support innovation in productivity (F01) – Boost integration between R&D and agriculture (F02)	01 Knowledge	7.85% RDP expenditures
	1B Strengthen links with research	Boost integration between R&D and agriculture (F02)	16 Cooperation	363 cooperation projects
	1C Training	Capacity building (F03)	01 Knowledge	19 245 participants trained
P2 Farm Viability, competitiveness, and sustainable forest management	2A Improve economic performance of agricultural enterprises	Boost investment to innovate and potentiate enterprises (F05) Support diversification (F06) Strengthen collective access to credit (F10) Improve water and energy efficiency (F18) and (F19) Boost agricultural activities in peri-urban areas (F27)	01 Knowledge 02 Advisory 04 Investments 06 Farm/business development 08 Forest investments 16 Cooperation	1.18% of holdings with RDP support

PRIORITY	SUB MEASURES	NEEDS	TYPE OF MEASURES	TARGET
	2B Generational Renewal	Improve entrepreneurship boosting generational renewal (F04) Boost investment to innovate and potentiate enterprises (F05) Strengthen collective access to credit (F10)		
Priority 3: Food chain organisation, including processing and marketing of agricultural products, animal welfare and risk management	3A Improve the competitiveness of primary producers with better integration in the supply chain	Boost investment to innovate and potentiate enterprises (F05) Boost aggregation and integration of agricultural offer (F07) Promote food chain competitiveness and sustainability (F08) Promote product certification process (F09) Strengthen collective access to credit (F10) Promote high energy efficient systems (F19)	01 Knowledge 02 Advisory 03 Quality schemes 04 Investments 05 Animal welfare 16 Cooperation	0.81% of agricultural holdings receiving support for participating in quality schemes, local markets, and short supply circuits
	3B Support risk management	Activate new risk management instruments (F11) Restore agricultural and forestry potential (F12)	01 knowledge 02 Advisory 03 Restoring agricultural potential	2.32% of farms participating in risk management schemes
Priority 4: Restoring, preserving, and enhancing ecosystems in agriculture and forestry.	4A Biodiversity	Support and restore of ecosystems (F13) Expansion of eco-friendly farming activities (F14) Containment of invasive species (F15) Safeguard forestry (F23)	01 Knowledge 02 Advisory 04 Investments 07 Basic Services 08 forest investment 11 organic farming 12 NAT-WFD 13 ANC 16 Cooperation	0.2% of forest/wooded areas under contracts 21.4% of agricultural land under contracts
	4B Water Mangement	Improve water quality reducing pollution discharge (F16)	11 organic farming 12 NAT-WFD 13 ANC 16 Cooperation	16.36% of agricultural land under contracts
	4C Soil erosion and management	Promote sustainable soil management (F17)		15.74% of agricultural land under contracts
Priority 5: Resource efficiency and shift to low carbon and climate resilience economy in agriculture, food, and forestry industry.	5A Water Efficiency	Improve efficiency of water resources (F18)	01 Knowledge 02 Advisory 04 Investments 16 Cooperation	1.45% of irrigated land switching to more efficient irrigation systems
	5C Renewable energy	Diversification (F06) Develop low pollutants bio-energy (F21)	01 Knowledge 02 Advisory 04 Investments 16 Cooperation	EUR 42 868 656 invested in renewable energy products
	5D Reducing GHG and NH3	Improve water quality reducing pollution discharge (F16) Develop low pollutants bio-energy (F21)	01 Knowledge 02 Advisory 04 Investments 10 AEC 16 Cooperation	1.13% of livestock units concerned by investments in reducing GHG emissions. 7.45% of agricultural land under management contracts targeting reduction of GHG
	5E Carbon conservation and sequestration	Promote sustainable soil management (F17) Safeguard forestry (F23)	01 Knowledge 02 Advisory 08 Forests 10 AEC	6.53% of relevant areas under management contracts aimed to carbon sequestration or conservation
Priority 6: Social Inclusion, poverty reduction	6A Diversification, creation of small enterprises and jobs	Promote new business and diversification in rural areas (F25)	06 farm/business development	113 jobs created in supported projects
	6B LEADER (Rural development)	Develop low pollutants bio-energy (F21)	01 Knowledge 07 Basic services	17% of rural population under local development strategies

PRIORITY	SUB MEASURES	NEEDS	TYPE OF MEASURES	TARGET
		Address demographic change (F24) Promote new business and diversification in rural areas (F25) Promotion of local potential (F26)	16 Cooperation 19 LEADER and CLLD	6.33% rural population with improved services 111 jobs created (via LEADER)
	6C Access to and quality of ICT	Implement infrastructure digitalisation (F28)	ICT 01 Knowledge 07 Basic services	5.38% of rural population benefiting from new or improved ICT infrastructures/services

3.6 List of interviews

INSTITUTION/ENTITY	ROLE	DATE OF THE INTERVIEW
Canale Emiliano Romagnolo	Technical Manager	12/02/2018
Regione Emilia Romagna - Dipartimento Agricoltura, caccia e pesca.	Direttore Produzione Integrata	15/02/2018

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4. SOCIAL PROTECTION INFORMATION SYSTEM – SPIS (LITHUANIA)



4.1 Introduction

Social Protection Information System (SPIS) is a complex database that enables municipalities and other public institutions to collect, store, monitor and exchange information on social assistance provision. After a period of development supported by the EU Cohesion Policy, the system also offers online social assistance application services at different levels of interactivity and collects related data.

The SPIS serves as a **good example of policy learning in e-governance under constraints**. First, there is no direct subordination between the Ministry of Social Security and Labour and municipalities. Therefore, finding consensus played a major role in building the SPIS, and lessons may be drawn for managing digital government policies involving many actors, and related to EU Cohesion Policy. This programme may also be applicable in areas other than social protection. Second, **forging partnerships** in the SPIS led to closer collaboration among involved institutions, improving social protection policy implementation. Third, management of social assistance became more efficient due to **decreased administrative burden**. Improved data availability for **policy planning and forecasting** trends is another benefit for institutions. These factors may serve well for policy learning in demonstrating how e-government tools can help different institutions to improve their processes. Fourth, the SPIS increased **accessibility to social assistance** and planned upgrades should further facilitate online application procedures.

This case study will identify how digital services may improve the provision of government services for citizens. The SPIS project was funded by the European Structural Investment funds (ESIF). Hence, the case study will show if the Cohesion Policy framework contributed to the Digital Agenda for Europe and the Digital Single Market, and what its added value is⁴³.

4.2 Strategic and policy framework

4.2.1 Territorial needs

Lithuania is a country in the Baltic region of north-eastern Europe with a population of nearly three million. In 2016, Lithuania had a GDP of EUR 38.67 billion⁴⁴. Lithuanian economy mostly relies on service sectors contributing around 68% to GDP and employing approximately 67% of the active population. The industrial sector is also important and creates about 29% of GDP employing 25% of the active population. Lithuania's main industrial sectors are electronics, chemical products, machine tools, metal processing, construction material, household appliances, food processing, light industry (including textile), clothing and furniture⁴⁵.

Regarding digitalisation performance, **Lithuania ranks 13th out of 28 EU Member States in the European Commission Digital and Society Index (DESI) 2017**⁴⁶. Lithuania performs very well in connectivity. Broadband coverage of the country accounts for 99% (16th place in

⁴³ Using the European Commission (2017), Peer Review on Social Protection Information System: Host Country Discussion Paper – Lithuania as the primary source.

⁴⁴ Eurostat (2018), Economy and finance statistics.

⁴⁵ IMF (2016), *World Economic Outlook Database*. Extracted from <https://www.nordeatrade.com/en/explore-new-market/lithuania/economical-context>

⁴⁶ This whole paragraph is based on the data of Europe's Digital Progress Report 2017 and Lithuania Information Society Development Committee under the Ministry of Transport and Communications data.

the EU), 4G coverage for 96% (4th place in the EU). 75% of people are subscribed to a mobile broadband (19th place in the EU). 63% of households use broadband connection (22th place in the EU). Most of them (61%) use fast broadband (more than 30Mbps, 7th place in the EU). Lithuania also performs well above the EU average in the integration of digital technology by business. Business enterprises in Lithuania actively use opportunities offered by various digital technologies (e.g. e-invoices, social media, online-commerce, electronic information sharing). In addition, Lithuania is improving and broadening its online public services and is increasing the uptake of e-government. Around **43% of internet users use e-government services** (8th place in the EU). However, Lithuania is still lagging behind in promoting open data. Another weak spot for Lithuania is human resources. Only 72% of the population use the internet (21st place in the EU), an only 52% of individuals have at least basic digital skills (17th place in the EU). ICT specialists represent 2.1% of total employed individuals (26th place in the EU), and only 1.8% of people aged 20-29 are STEM⁴⁷ graduates (21st place in the EU).

4.2.2 Local strategic and policy context

Strategic architecture

The SPIS was developed through projects funded by the Cohesion Policy framework. The Information Society Development Programme for 2014–2020 '**Digital Agenda of the Republic of Lithuania**' is the most important document setting the goals for the development of information society⁴⁸. The programme's goals are being implemented mainly by using ESIF and national or municipal funding. No other funding opportunities (e.g. EIB, EFSI, CEF, H2020) are actively used in Lithuania. ESIF cover around 70% of total investments in information society⁴⁹.

The document mentioned above reflects the Digital Agenda for Europe. **The majority of the Digital Agenda for Europe pillars are covered**, except environment-oriented ICTs and ICT related R&D and innovations. The latter is covered by other strategic documents – National Progress Programme for 2014–2020 and the Lithuanian Innovation Development Programme for 2014–2020.

Other strategic documents also highlight the development of information society and ICT as strategic priorities. **Strategy Lithuania 2030** aims at developing state of the art ICT and digital infrastructures, as well as adopting ICT in the development of lifelong learning system. In addition, many programmes in different fields of policy are related to the Information Society Development Programme for 2014–2020 'Digital Agenda of the Republic of Lithuania' (e.g. The Programme for the Development of Public Administration for 2012-2020, Lithuania Health Programme for 2014-2025, The 2015-2020 Programme for Protecting and Mainstreaming Digital Cultural Heritage, etc.). These programmes have measures that directly contribute to the Information Society Development Programme for 2014–2020 'Digital Agenda of the Republic of Lithuania' (e.g. the development of e-governance is foreseen in the Programme for the Development of Public Administration for 2012-2020).

The overall logic of intervention

As ESIF (principally ERDF but also ESF) are the main funding instruments for the development of the Information Society, the next paragraph reviews the main priorities of the Lithuanian Operational Programme for the European Union Funds' Investments in 2014-2020 (ERDF, CF, ESF) and their contribution to the Digital Agenda for Europe.

⁴⁷ Science, Technology, Engineering and Mathematics.

⁴⁸ ESTEP (2015). study '*Europos skaitmeninė darbotvarkė: Lietuvos požiūris*', for the Ministry of Foreign Affairs, Vilnius.

⁴⁹ Data provided during the interview with officials on the 15th of February, 2018.

The second priority axis of the Operational Programme for the European Union Funds' Investments in 2014-2020 is dedicated to promoting information society. It has three main priorities:

1. Extending broadband deployment and the roll-out of high-speed networks and supporting the adoption of emerging technologies and networks for the digital economy
2. Developing ICT products and services, e-commerce, and enhancing demand for ICT
3. Strengthening ICT applications for e-government, e-learning, e-inclusion, e-culture and e-health

The Table below outlines the concrete actions of the programme that will contribute to the Digital Agenda for Europe.

Table 3. The contribution of Operational Programme for the European Union Funds' Investments in 2014-2020 to the Digital Agenda for Europe

DIGITAL AGENDA FOR EUROPE PILLAR	EU FUNDS INVESTMENT PROGRAMME MEASURES
Digital single market	Developing tools to ensure that public sector information is available for reuse, and encouraging businesses to use this information for the development of new digital services and products.
Interoperability and standards	Developing and launching measures and solutions needed for the development and provision of advanced e-services (e.g. tools for the optimisation, interoperability, and security of the public sector ICT infrastructure).
Trust and security	Launching measures for the protection of the state's ICT infrastructure of particular importance
Fast and ultra-fast internet access	<ul style="list-style-type: none"> • Further development of broadband infrastructure. • Developing technological solutions for more effective market regulation and development in order to promote the supply and demand of broadband electronic communications.
Research and innovation	Including measures for business in transport, logistics, and ICT sectors, measures for increasing access to electronic resources needed for R&D (e.g. access to databases, publications), and infrastructure for increasing STEM popularity. These measures are funded under the first priority axis.
Enhancing digital literacy, skills and inclusion	Increasing the demand for ICT among the population (e.g. by upgrading public internet access infrastructure and encouraging smart use of the internet).
ICT-enabled benefits for EU society	Expansion and improvement of electronic public and administrative services.

Source: https://www.urm.lt/uploads/default/documents/uzienio_politika/ES/ES_tyrimai/Studija6.pdf and Lithuania Operational Programme for the European Union Funds' Investments in 2014-2020.

ICT can be seen as **a sector itself**, as it has a separate priority axis in the EU Investment Programme 2014-2020 and is also **one of the priorities of Smart Specialisation Strategy** (funded under the first priority axis). ICT are also a **horizontal priority** as it is implemented through many different programmes and initiatives. Even the priorities of the Digital Agenda of the Republic of Lithuania are oriented towards different policy fields (e.g. public administration,

culture and Lithuanian heritage, business competitiveness, etc.). ICT play an essential role in other policy fields by widening scope and increasing access and quality of government services, creating new opportunities for learning online, developing tools for competitiveness of business, etc.

Governance and partnership

The Ministry of Transport and Communications is a key player in implementing the DAE in Lithuania. It is responsible for the overall coordination of the Information Society Development Programme for 2014–2020. The Council for Digital Agenda helps the coordinator to assess progress and initiate strategic decisions. The Information Society Development Committee is responsible for the monitoring of the programme. Another important player is the Ministry of Finance responsible for the **EU funds, which constitute the lion's share of the funding for digital agenda** in Lithuania. Other Government institutions are responsible for the implementation of the programme in the specific fields assigned to them.

There is a **shortage of ICT professionals** in Lithuania⁵⁰. The issue is also relevant in the public sector. However, the administrative capacities of the public sector to implement ICT projects are sufficient, as public sector institutions organise training for their workers. In addition, workers learn a lot at their workplace.

A National Digital Coalition was established to increase the supply of IT specialists, increase the popularity of ICT and other STEM professions among youth, and raise the awareness about the importance of digital skills. The Coalition consists of Government institutions, social partners (e.g. Infobalt, Baltic Education Technology Institute, Young Innovators, etc.), and education institutions⁵¹.

4.3 Main features of the selected project

4.3.1 Description

The SPIS is designated to ensure adequate provision of **social support and social services across all 60 Lithuanian municipalities**. The main aims of the SPIS are as follows:

- To collect, provide, and summarise information on all social support and social services provision at the municipality level;
- To strengthen cooperation between the national state authorities and municipalities in providing social assistance
- To prevent citizens from simultaneously receiving social support from several municipalities;
- To simplify the application for social support and social services through an online service that operates under a single window principle.

While the idea and the work towards creating the SPIS began in 1997, **the creation of a centralised online social assistance application took place in 2010-2013** with the project⁵² implemented under the 2007-2013 Cohesion Policy framework. The second stage of the project involved improving online social assistance application services to be compatible with mobile devices and the Euro currency settings (the ERDF contributed the majority of resources with a total sum of EUR 3.2 million, while the Ministry of Social Security and Labour provided additional EUR 567 000). The SPIS is **further developed under the 2014-2020**

⁵⁰ Cedefop (2016), EU skills panorama. Lithuania: Mismatch priority.

⁵¹ Webpage of National Digital Coalition. <http://www.skaitmeninekoalicija.lt/lt/apie/>

⁵² EU Investment funds portal for 2007-2013 funding period. <http://www.esparama.lt/paraiska?id=21544&pgsz=10>

Cohesion Policy Framework⁵³. The ERDF project aims at broadening the scope of the SPIS. After the project, all the social assistance services will be available on the SPIS at least at the fourth level of interaction⁵⁴ (the ERDF contributes EUR 2.036 million for this project). Another Cohesion Policy Framework project is **funded under the ESF** (total value of the project is EUR 10 000) and aims at creating an app to enable social workers to use SPIS during their visits.

The SPIS is mainly used by municipality officers to manage social assistance provision. Municipality officers can access particular user applications and view databases with specific information on each individual. In addition, the system operates as an online service provider for individual users. They can request and receive some types of social support and social services through it.

4.3.2 Project cycle

The SPIS was developed to **increase the effectiveness of the social assistance provision**. The process of applying and receiving social assistance was inconvenient for both individuals in need and municipal officers. An individual had to either present him or herself at the municipal office or send the required forms by post. In addition, filling the forms by hand was confusing, time-consuming, and stressful, as the individual had to collect all the necessary documents from all relevant institutions him or herself. Municipal officers then had to administer all the requests manually (gathering relevant data from other institutions, cross-checking facts with other municipalities, etc.). Also, individuals were able to abuse the social assistance system because municipal officers could not check if a person already had a file in the remaining 59 municipalities. In order to overcome these problems, the Ministry of Social Security and Labour decided to develop the SPIS. Initially, it was a tool for municipal officers, but later it incorporated online social assistance application services for individuals⁵⁵. All 60 municipalities and the Ministry of Social Security and Labour had **numerous discussions and debates that allowed institutions to build consensus and develop a sense of ownership of the SPIS**. Although it took time, this helped develop the project at the later stages.

The main difficulties in the implementation of the project can be divided into project management difficulties, difficulties for individuals, and challenges for municipal officers. In general, **development of the SPIS was very well managed**. Cooperation with municipalities was smooth; public procurement went on without any complications. Only the following minor issues occurred during the project:

- Converting currency from Lithuanian litas to euro was a challenge. However, funding for this procedure was foreseen in the project. Hence the project team dealt with this challenge.
- Lack of human resources for the maintenance of the SPIS. Currently, the Ministry of Social Security and Labour needs to buy external expertise for maintenance of SPIS. It would be more efficient to have all the necessary resources on board.

Individuals faced the following difficulties:

- **Lack of digital skills**, especially among the elderly, disabled people, and socially excluded individuals, which discourages them from trying to apply for social assistance online.

⁵³ EU Investment funds portal for 2014-2020 funding period. <https://bit.ly/2IU4rI0>

⁵⁴ Fourth interaction level means that the service is fully available online and an individual can submit an application for social assistance and receive it online.

⁵⁵ Ministry of Social Security and Employment. *Socialinės paramos šeimai informacinė sistema*. Information provided by ministry representatives during interview and additionally provided related data. 16 October, 2017.

- Lack of clarity and need for better instructions, which leads to incomplete applications and submitting incomplete necessary documents. Besides, the SPIS interface could be more user-friendly and intuitive.

Municipal officers faced the following difficulties:

- **Lack of technical skills** and trust in using digital technologies, which prevents municipal officers from using the SPIS in its full capacity.
- **Limited access to information**, due to data confidentiality or gaps left by other officers. Data confidentiality is a complex legal matter, while data gaps occur because officers are not obliged to enter all the data and sometimes lack capacity to do so.
- Time-consuming process of checking invalid applications, resulting from incomplete applications submitted by individuals. Better instructions and technical barriers to submit an invalid application would help solve this problem.

The main output of the SPIS project was the **system for managing and monitoring social protection**. Municipal officers use the SPIS for their daily tasks. This generated the following results:

- Using the **SPIS increased the efficiency of municipal officers' work**, reduced the load of manual tasks, and provided municipal officers with more information about the individuals they consult.
- The procedure to request social assistance became **more accessible** for individuals. Hence, 26 types of social support and social services are available on the SPIS online application services.
- Other institutions and business use the SPIS as a source of information. For example, Lithuanian eldership offices use the SPIS to identify social assistance recipients within their jurisdiction to help them request social assistance, and schools use the system to monitor which pupils receive social assistance. In addition, Electricity Distribution Network Operator and banks use the SPIS data to identify people that are eligible for social benefits.
- Individuals are **unable to abuse the social assistance system** by receiving aid from several municipalities at once anymore, as municipalities share data among themselves.

Moreover, the following broader impacts could be assigned to the SPIS projects:

- The SPIS has become an **extensive database**. As a result, the Ministry of Social Security and Labour uses the SPIS data for drafting legislation, monitoring, and estimating the number of social assistance recipients.
- During the development of the SPIS the **cooperation between the Ministry of Social Security and Labour and municipalities improved** and became more efficient. The ministry can monitor social assistance in municipalities without specially requesting information, while municipalities benefit from technical support and assistance provided by the ministry.

The SPIS was developed mainly by using ERDF and ESF. The system is sustainable and is operating after the end of EU funding. As of 2018, the costs of the system maintenance are borne by the Ministry of Social Security and Employment⁵⁶. The SPIS maintenance costs are around EUR 553 000 per year (expenses may be higher during the periods when the system is being updated).

⁵⁶ Ministry of Social Security and Employment. *Socialinės paramos šeimai informacinė sistema*. Information provided by ministry representatives during interview and additionally provided related data. 16 October, 2017.

4.3.3 Contribution to the strategy in place and the Digital Agenda for Europe / Digital Single Market

The SPIS contributes to increasing the scope of online public services and uptake of e-Government. It contributes to the second goal of the Information Society Development Programme for 2014–2020 'Digital Agenda of the Republic of Lithuania' – creating advanced public e-services for citizens and encouraging citizens to use e-services. The SPIS also contributes to two Digital Agenda for Europe pillars – interoperability and standards and ICT-enabled benefits for EU society. It is hard to define the extent to which the SPIS contributes to these goals, as it is just one project among many other initiatives.

4.3.4 Success factors, limitations and other issues

The most significant success factor in developing the SPIS was a **successful partnership between the Ministry of Social Security and Employment and 60 municipalities**. The municipalities are legally obliged to provide some of the data on social assistance to the ministry, but not all of them. Thus, the SPIS database can be considered a major achievement. The long discussions and numerous debates from the beginning and during the projects allowed stakeholders to **reach mutual consent**. Municipalities felt ownership of the system and felt enthusiastic towards further development of the SPIS. They still have many suggestions for improvement of the SPIS, and they will hopefully be taken on board in due time. The following further developments of the SPIS are foreseen:

- Increasing the scope and the number of social assistance services. In three years, all social support and social services will be available on the SPIS.
- Legalising the submission of scanned or digital documents is foreseen. Currently, in specific cases, an individual must submit an original document that cannot be accessed by the SPIS users (e.g. proof of purchase).
- Integration of other databases (e.g. Lithuanian judicial information system (LITEKO), e-Health).
- Creation of a virtual e-file, so municipalities would not have to print any files.

The main added value of the Cohesion policy support is the **development of a centralised system, improving cost-efficiency (e.g. through economies of scale) and solving interoperability issues related to the existence of several municipal systems**. Without EU funding the municipalities (especially smaller ones) would not have enough resources to create comparable system, although larger municipalities (e.g. Vilnius municipality) had plans to create their own. With the EU investment, the nationwide system was created improving data availability and cooperation between municipalities and the Ministry of Social Security and Employment. Such outcome would not be possible without EU funding. In addition, EU funding provides resources for further development and improvements of the system. National funding for such activities would not be available.

4.4 Conclusions and lessons learnt

The SPIS can be viewed as a good practise example for other EU Member States, contributing to national and EU objectives in terms of e-public services. Firstly, the SPIS serves as an illustration of an **efficient digital system for the provision of social assistance**. It minimises the administrative burden, allows different institutions and units to share information, and provides data for monitoring. However, there are still **some legal restrictions related to data sharing and accessibility** that need special attention. A country creating a similar system should be aware of such barriers, which are also country-specific.

Secondly, the SPIS projects have demonstrated that an **effective partnership**. Indeed, the main condition for the success of the project was an effective partnership between the Ministry

of Social Security and Employment and 60 municipalities. The partnership was especially important as the ministry does not have any legal obligations to control municipalities in the field of social assistance. Hence, mutual and consensus-based decisions at the beginning of the project laid grounds for its successful implementation and further cooperation.

Cohesion Policy has critically contributed to the implementation of this project since 2007-2013, its funding allowing the effective concretisation of plans that have started in 1997. Moreover, Cohesion Policy's continuing support has been essential in **broadening the scope of the project**, while ensuring that maintenance costs should be supported by national and local resources. Finally, this example shows that Cohesion Policy Funds can **support a complementary approach**, with ESF funding addressing some of the human capital issues raised by the development of the SPIS.

4.5 List of interviews

INSTITUTION/ENTITY	ROLE	DATE OF THE INTERVIEW
Division of the Ministry of Social Security and Labour	Chief specialist of the Strategic Analysis	13/02/2018
Ministry of Social Security and Labour	Head of IT Division	13/02/2018
Ministry of Transport and Communications	Deputy Director of the Information Society Development Committee	15/02/2018
Information Society Development Committee under the Ministry of Transport and Communication	Head of planning and monitoring department	15/02/2018

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<http://www.skaitmeninekoalicija.lt/lt/apie/>

5. BROADBAND NETWORK DEVELOPMENT - ICT INFRASTRUCTURE (PODKARPACIE, POLAND)



5.1 Introduction

Poland joined the European Union in 2004. In the past 27 years, the country has undergone a significant social and economic transformation from a centrally-planned system to the market economy. Yet, the catching-up process has not been completed. In particular, many performance indicators, including those related to Information Society development, are still below EU average. **Access to the broadband Internet infrastructure in Poland is relatively poor**, in comparison with the other EU Member States. Granting such access is a prerequisite for enhancing other dimensions of Information Society within the framework of the Digital Agenda for Europe (DAE).

To reduce the existing gap, **large EU co-funded investment projects in the fibre optic network** were made in Poland in the 2007-2013 programming period. These projects were mainly part of the Regional Operational Programmes. In the 2014-2020 programming period, the Operational Programme Digital Poland (OPDP) was introduced. The programme is nationwide. However, investments in broadband infrastructure are provided at the local level (NUTS3, LAU⁵⁷ 1 and 2 regions), within the first axis OPDP 'Common access to high-speed Internet', action 1.1 'Eliminating territorial differences in terms of access to high-speed broadband Internet'. Such investments cover projects aimed at providing access to broadband networks in areas at risk of digital exclusion (e.g. rural areas).

The focus of this case study is on the **emergence of broadband Internet infrastructure in one of the economically disadvantaged Polish regions – Podkarpackie**.⁵⁸ We concentrate on the rationale of the intervention, governance of the process, funding scheme and its impact on project durability, as well as on strengths and weaknesses of this approach to provide broadband Internet to deprived, digitally excluded areas. We also analyse complementary actions and synergies with other public policies and DAE-related interventions.

5.2 Strategic and policy framework

5.2.1 Territorial needs

The case study concentrates on Podkarpackie, located in South-Eastern Poland. It borders Ukraine (to the east) and Slovakia (to the south). This region is **characterised by important territorial contrasts**. On the one hand, Rzeszow – the capital of the region - is called the 'Polish capital city of innovativeness', as it hosts many IT enterprises (including one of the biggest Polish IT company – Assecco Poland). It also records one of the highest ratios of students in tertiary education to the number of inhabitants in the whole European Union and has one of the best-developed broadband access networks in Poland. The region is famous because of the 'Aviation Valley', which is a cluster of aviation suppliers for corporations like Boeing, Airbus, Lockheed Martin, etc. On the other hand, Podkarpackie is characterised by an overall low economic development level, significant issues with rural development and relatively high employment in agriculture. As already mentioned, Podkarpackie is one of the poorest regions in Poland. GDP per capita in 2015 reached 70.9% of the Polish average (the

⁵⁷ Local administrative unit, basic components of Classification of Territorial Units for Statistics (NUTS) regions.

⁵⁸ We treat all projects conducted within action 1.1 of the OPDP in the Podkarpackie region as one case study.

same level as in Warminsko-Mazurskie region) – only the Lubelskie region recorded a worse result (68.5%).

Large parts of the region are covered by the Bieszczady mountains, which is a tourist attraction but creates technical difficulties to the provision of infrastructure (including broadband Internet infrastructure). The population density in 2016 was 119 persons per km², and varied significantly from 1611 in Rzeszow, to 19 and 32 in, respectively, *Bieszczadzki* and *Leski* counties (LAU 1 regions). Net migrations have been negative for many years, which has led to continuous depopulation of the region.

Main Information Society performance indicators for Poland show rather moderate results – DESI 2017 ranked Poland 23rd out of 28th EU Member States and clustered Poland as a low performing country. In the connectivity dimension, which is of major importance from the point of view of this case study, Poland was ranked 25th, because of the low fixed broadband coverage, and low fixed broadband take-up and NGA coverage. The number of 'NGA white dots'⁵⁹ in the Podkarpackie region, reported by the Office of Electronic Communication, is almost 192 000. Even in Rzeszow, there are still 18 'NGA white dots'. However, if access to the Internet by companies and households is taken into account, results of the Podkarpackie region are close to the Polish average.

5.2.2 Local strategic and policy context

The **strategic approach of the intervention is based on the Operational Programme Digital Poland**. OPDP is deeply rooted in the DAE framework, especially for its contribution to the 'Fast and ultrafast Internet access' pillar. The **development of broadband Internet infrastructure has been addressed by strategies in the Podkarpackie region for many years**. These activities are in line with development patterns identified in the 'Region's Development Strategy – Podkarpackie 2020', and 'Regional Innovation Strategy of the Podkarpackie Voivodship for smart specialisation (RIS3) 2014-2020'. They identified two main smart specialisations areas: Aeronautics and Space Technology⁶⁰, and Quality of Life and included Information and Telecommunications as additional horizontal smart specialisation areas. The **ICT sector has indeed been perceived as crucial for each smart specialisation area**. In the 2007-2013 period, Podkarpackie regional authorities implemented the 'Digitalisation Strategy of Podkarpackie Region in 2007-2013, A civilisation jump of Podkarpackie' which was entirely dedicated to the development of Information Society. Additionally, Podkarpackie region took advantage of Operational Programme Development of Eastern Poland, within which the project 'Broadband network of Eastern Poland' was implemented. The goal of this project was to provide individuals, public institutions and enterprises with access to broadband services, through the development of backbone and distribution networks. However, the issue of the 'last mile' (that is to say the connection between the backbone network and the end user) was not addressed. To sum up, in the strategic approach (at the national, regional and local levels) **ICT is considered to be an important sector but also a horizontal priority**.

Investments undertaken within the 2007-2013 programming period have created the **basis for building and extending the broadband network**, ensuring access to NGA services (minimum 30Mbps) and developing ultra-fast broadband. In the previous programming period, the main focus was on the development of backbone networks, which was delivered through Regional Operational Programmes (OP Development of Eastern Poland in the case of

⁵⁹ 'NGA white dots' are areas which are not benefiting from an Internet access of at least 30Mbps, or 100Mbps in case of educational institutions.

⁶⁰ Aerospace industry is one of most important sectors for the economy of the Podkarpackie region. Interestingly, around 90% of the industry potential in Poland is concentrated in the region within the Aviation Valley cluster.

Podkarpackie), with the support of EU funds. Among the main weaknesses identified for that period, two are of major importance. Firstly, **these projects were managed by local and regional authorities, which had insufficient competence in the area of broadband infrastructure investments.** Secondly, as it was a backbone network, **households, SMEs and other stakeholders could not take real advantage of these investments.** Indeed, individuals and institutions were aware that the broadband networks had been built, however they were not granted access to them (because of the previously mentioned 'last mile' issue), creating important frustration.

In the 2014-2020 period these weaknesses were tackled – under the axis I of the Operational Programme Digital Poland (development of broadband access networks). Action 1.1 of the Programme is managed centrally by the 'Centre for Projects Digital Poland' (CPDP), which possesses the required expertise. The projects to be implemented are chosen thanks to a special tendering procedure, and **only telecommunication operators may be beneficiaries of the Programme** (in duly justified cases local authorities may join the tender). The Programme covers all Polish regions, however it is focused only on local areas (within NUTS3), which are classified as deprived areas in terms of broadband coverage (the so-called 'NGA white dots'). At the beginning of the process, the Office of Electronic Communication in cooperation with Ministry of Digital Affairs, CPDP and telecommunications operators have prepared a list of 'NGA white dots' in all Polish regions. This list is a basis to indicate areas, which will be covered by the OPDP action 1.1. To prevent a deadweight loss effect, **telecommunications operators are asked to provide information about their plans concerning broadband infrastructure investments in these 'NGA white dots' areas** (in a recent call about 800 initiatives covering the selected 'NGA white dots' were reported by the operators). These plans are verified by the CPDP – if they are logic and feasible it means there is high probability that broadband infrastructure will be provided in these 'NGA white dots' without public (EU) co-financing. Thus, these areas are not taken into account for the OPDP action 1.1. As a result, **public intervention occurs only in deprived areas, in which broadband access networks would not be provided through private initiatives.** This approach increases the efficiency of the intervention⁶¹.

A key message stemming from interviews with representatives of CPDP and large telecommunications operators is that the **approach to develop broadband Internet infrastructure in the 2014-2020 period under OPDP action 1.1 is coherent, even if complex. It allows for the achievement of DAE and Digital Single Market goals for Poland**, including in the Podkarpackie region. The developed broadband infrastructure in 2014-2020 should meet DAE minimum goals till 2020. However, taking into account that most of the telecommunications operators usually build 100Mbps networks (as they are aware that being owners of this infrastructure this is an optimal solution to meet the Internet users demand for fast connectivity), it is realistic to foresee that Digital Single Market goals will be reached sooner than in 2025. Additional investments in 5G infrastructure will require relatively minor financial and organisational effort. As a result, investments under the OPDP action 1.1 shall lead to a leapfrogging effect regarding the quality of broadband network in Poland. Indeed, around 90% of all projects are based on fibre-optic technology, while in the previous programming period much more investment projects used wireless technology, which requires more frequent upgrades.

⁶¹ However, there are examples of areas identified as 'NGA white dots', which are uninhabited and thus there is no demand for broadband infrastructure, Nevertheless, as there are some building and facilities there, these areas are taken into account for intervention within OPDP action 1.1.

Interventions in broadband network development in the period 2014-2020 creates **synergy effects with other actions undertaken within the OPDP** (e.g. E-government and digital competencies), and within other policies. A notable example of such synergy is the emergence of the National Education Network (*Ogólnopolska Sieć Edukacyjna* in Polish), which was introduced in June 2017. NEN is going to provide access to ultrafast (and secure) Internet, technical support, educational digital content and tools, to support the development of digital skills among pupils and teachers in all Polish schools. The positive externalities shall consist of better involvement of parents and local governments into the educational processes. The operator of the Network is NASK (which is a national research institute subordinate to the Ministry of Digital Affairs). This project will take advantage of the existing fibre-optic infrastructure and of the new broadband network developed within the OPDP programme. Indeed, access to this newly-built network must be granted to all schools in the area covered by the contract. At present, only 10% of schools have access to a 100Mbps Internet connection. According to the agreed timeline, access to this broadband infrastructure will be granted to 1 500 schools in 2018, 12 700 in 2019 and finally all (19 500) schools in 2020. Because Poland celebrates the 100th anniversary of independence in 2018, the project was named '100Mbps for 100 years' and was nominated for the WSIS (World Summit for Information Society) Prizes 2018⁶². However, as the financial allocation to the OPDP action 1.1 is not enough to cover all 'NGA white dots' (see map 8 in Appendix), NASK will build and provide these schools with access to the broadband infrastructure. Thus, the National Education Network is complementary to the actions within OPDP 1.1.

The governance of the programme and individual projects is based on **cooperation between public institutions and private companies in a form that is similar to public-private partnership**. Public (EU) resources support the investment phase of broadband network development, which is then owned and maintained by the telecommunication operator – thus **significant part of the risk is transferred to the operator**.

In the proposed 'business model' of the broadband access development under OPDP action 1.1, the crucial element from the point of view of beneficiaries is to gain clients – Internet users or other telecommunications operators. Part of the project budget is devoted to promotion and communication activities. However, **how the operators will reach the local market depends solely on them**. There are many public relation strategies deployed to achieve this goal. They include contacts with local authorities, distribution of promotional leaflets and posters, participation to local events, door-to-door sale activities or even cooperation with clergymen in remote rural areas. Generally, in small towns or villages, the best promotional results are based on personal recommendations of Internet users.

The OPDP also contains measures for training activities addressed to telecommunications operators (helping them drafting good applications, for example). During training sessions, all details related to the public tender procedure, project realisation (e.g. the expected technological solutions and parameters to be delivered) and the expected lasting effects are presented. These training activities are organised and provided by the CPDP, and are co-financed by OPDP resources.

⁶² The WSIS (World Summit on the Information Society) Prizes are awards to 'evaluate and recognize individuals, governments, civil society, local, regional and international agencies, research institutions and private-sector companies for outstanding success in implementing development oriented strategies that leverage the power of ICTs as an enabler of the development.'

5.3 Main features of the selected project

5.3.1 Description

The selected case study is a public intervention to develop broadband infrastructure in the Podkarpackie region. It is supported by the European Regional Development Fund under the framework of the Operational Programme Digital Poland 2014-2020. A specific focus was put on the activities undertaken within the action 1.1. in the axis I of the Programme. The action 1.1 is **aimed at granting access to fast and ultrafast Internet networks in remote and underdeveloped geographical areas**. The geographical scope of the case study is limited to the area of the Podkarpackie region or, to be more precise, to the NUTS3, LAU 1 and 2 level regions, in which telecommunications operators were contracted in the public tender procedure to build broadband access networks.

5.3.2 Project cycle

At the time of writing, **two rounds of tenders have been completed, and a third one is open**. The list of projects implemented in the Podkarpackie region (in LAU1 regions located in 3 out of 4 NUTS3 regions in Podkarpacie) during the **first round** of the procurement in the OPDP action 1.1, contains altogether 11 projects: one in the Krosnienski, Sanocki and Lezajski counties, two in the Nizanski county, and three in Jaroslowski and Przemyski counties. The number of 'NGA white dots' in these LAU 1 regions is the following: Krosnienski county – 15 562, Sanocki – 5 851, Jaroslowski – 7 075, Przemyski – 6 587, Lezajski – 1 040, and Nizanski – 5 682. Projects in the Przemyski county have already been finalised: around 210 kilometres of fibre-optic infrastructure have been built, 3 776 households and eight public institutions have been given the opportunity to connect to this network. Projects in other LAU1 regions under the first round are to be completed in the 3rd and 4th quarter of 2018. They will provide access to the broadband network to 13 950 households and 16 public institutions. Total allocation of ERDF funds for the first round in the Podkarpackie region amounted to EUR 6.9 million.

The **second round** of public tenders under OPDP action 1.1 is already closed, and contracts with telecommunications operators have been signed. The Centre for Projects Digital Poland has not provided detailed information on these projects yet – available data concerns the geographical area and number of households which will be covered by broadband network access. During this round, all counties from the Krosnienski, Przemyski and Rzeszowski NUTS3 regions have been included, and the scale of projects is bigger than in case of the first round – (see map 8 in appendix) for a total ERDF allocation of EUR 12.4 million.

Indeed, since the second round, **the CPDP has changed its approach and has decided to expand the scope of broadband networks provided by each project. It aims at covering more local area units in a NUTS3 territory**. This decision is the effect of the learning-by-doing process – as more potential Internet users would have access to the network, telecommunications operators would obtain scale economies, which are crucial for the project feasibility. As a result, the average cost of providing access to one address point has been reduced by 50%, and in some cases by 90%, compared to programmes in the 2007-2013 period. The **scale effect has a major importance, especially in remote areas**. As one representative from a telecommunications operator pointed out, there are situations in which the maintenance cost of the broadband network providing access to the Internet to one household is three times higher than the fees this household is willing to pay. The reduction of the average investment cost of broadband access is also a result of the logic of intervention: **proposed cost of the investment and the number of households covered by broadband are two important parameters in the tendering procedure**. The telecommunications operators, which present the cheapest offer with highest number of covered households are granted the contracts.

The specific 'business model' of the intervention is a solution that influences positively the efficiency of action 1.1 in the Podkarpackie region. As the intervention covers remote areas, the potential demand for broadband access is not enough to make the project profitable for a private operator. Thus public (in this case EU) co-financing is required to develop a broadband access infrastructure. The telecommunications operators build the broadband infrastructure⁶³, with ERDF co-financing, and when the project is finished, they become the owners of this infrastructure. They are obliged to grant access to individuals and institutions, as well as to other telecommunications operators. They also cover all the maintenance cost of this infrastructure. This leads to the situation, in which the **operators – owners of the network – are highly motivated to look for clients and provide them services to cover the maintenance cost and make a profit**⁶⁴. Because of the potential low profitability of the investment, there are two groups of operators that are interested in taking part in OPDP action 1.1. The first group are **large telecommunications operators**, which are interested in extending their network coverage to meet future needs related to providing smart technologies and Internet of Things solutions. The second group are **local operators, which are already providing internet access on the local market**. Their financial constraints are much higher than in the case of the former group. OPDP action 1.1 gives them a chance to extend their existing broadband network (the barriers to entry for small local operators are relatively high). Sometimes, taking part in tenders within OPDP action 1.1 is a rational strategy for local telecommunications operators willing to minimise competition. If another operator enters the market, it may lead to lower profitability and even bankruptcy of the 'traditional' local operators. It is worth mentioning that according to the tender requirements under OPDP action 1.1, each beneficiary (operator) must grant access to the developed network to other operators. The firm is obliged to provide information about the completion of the investment a month before the broadband infrastructure is ready and available. On the one hand, this opens more alternatives to Internet users, but on the other hand, it may have a harmful effect on the financial stance of the operator.

Experiences of telecommunications operators show that **establishing cooperation with local authorities from the very beginning of the project enhances the chances of a smooth completion of the project**. It reduces the time for acquiring the required authorisations, and approvals of technical documentation. It may even reduce the cost of investment (if local authorities perceive broadband infrastructure development as a significant driver of economic and social development, they may reduce local taxes and fees related to this investment). The **authorities' involvement and openness to cooperate with telecommunications operators** is mostly visible at regional and municipal levels. Regional authorities have already had their own experience in providing backbone broadband infrastructure during the 2007-2013 period. They are thus aware of potential problems related to such investments and of the role of Internet coverage for regional development. Municipal authorities usually support broadband network projects and are interested in the development of such infrastructure on their territory, as they perceive this as an important driver of socio-economic recovery, especially through improving attractiveness of small towns or villages for new investors and young people. One of the main problems of deprived areas in the Podkarpackie region is a significant negative balance of migrations, stemming from the fact that young people are moving to larger cities, which offer better prospects. However, the cooperation with county authorities is more complicated, as these authorities do not perceive these investments as being beneficial to them.

⁶³ They have to offer to provide broadband access to the minimum number of households required in the tender procedure for respective territories. According to the tender rules, broadband Internet access must be provided to all schools from the area.

⁶⁴ One of the telecommunications operators which provide broadband infrastructure in Podkarpackie region under OPDP action 1.1 estimated the return on investment will take 10-12 years.

To support the development of broadband infrastructure, the CPDP provides the operators with training and consultations. However, it **does not support telecommunications operators directly in assessing the potential demand for Internet services** (e.g. number of Internet users willing to connect to the new broadband network) in the areas covered by the projects. This task is a responsibility of the operators. Nevertheless, operators can estimate the demand and thus the potential profitability of the investments, by using the **available data on network penetration**. This parameter usually reaches 60%, but the CPDP data shows that for the projects completed under OPDP action 1.1 this is between 60% and 80%. One of the representatives of the telecommunications operators raised the issue about the stereotype linking rural areas to poverty and low willingness to take advantage of a new broadband network. Of course, as it was mentioned, providing fibre-optic network to remote areas where there are only few Internet users raise profitability issues. However, it turns out that inhabitants of these areas are interested in being connected to the broadband network, provided they are granted the opportunity.

5.3.3 Contribution to the strategy in place and the Digital Agenda for Europe / Digital Single Market

Interventions provided within Operational Programme Digital Poland 2014-2020, action 1.1, contribute to **two DAE goals**: full coverage of broadband above 30Mbps by 2020, and 50% of subscribers using broadband above 100Mbps. OPDP complies with Europe 2020 strategy mainly in the dimension of smart growth; however, the present case study is rather related to inclusive growth. OPDP action 1.1 will also enhance reaching the goals of Digital Single Market, namely access to connectivity offering at least 100 Mbps for all households.

5.3.4 Success factors, limitations and other issues

One of the main success factors is a change in the management of the programme. As mentioned earlier, the OPDP action 1.1 is **managed centrally by the Centre for Projects Digital Poland**. This institution is competent in infrastructural projects of broadband network development, which dramatically improved management quality in comparison to the 2007-2013 period when regional authorities were in charge of these projects. At present, the CPDP, which employs nineteen persons, manages 134 infrastructural projects in all Polish regions.

The other important factor is the **cooperation and partnership approach between the stakeholders, especially between the authorities responsible for planning and implementation of the programme and telecommunications operators**. Telecommunications operators have suggested two important solutions, which were accepted and introduced into the OPDP framework: firstly, they asked that investments be **focused on access**, not backbone infrastructure, and secondly – that **technology used to provide the broadband infrastructure should be neutral and open**.

Furthermore, the involvement of local and regional authorities, as well as community leaders, plays an **essential role for informing potential Internet users about the deployment of broadband infrastructure and gaining new clients** for the telecommunications operators.

However, there have also been some issues identified by telecommunications operators related to the investment process. Their biggest concerns refer to two issues. The first one is the **access to maps, which are necessary to prepare the technical documentation for a project**. These maps are often not digitised, especially in remote areas. It makes developing technical projects more challenging and investment processes longer. The other concern is related to **granting required permissions from the network administrators (e.g. energy operators) or property owners**. This has a great impact on the project schedule. As one of the telecommunications operators' representative pointed out, obtaining all permissions takes from 4 to 12 months, while building the network infrastructure lasts about one month.

One of the proposals to solve this problem would be to standardise procedures related to granting required permissions from various network administrators.

Support of the Cohesion policy in the deployment of broadband infrastructure in the remote and deprived areas of the Podkarpackie region (and in other Polish regions) is invaluable. There is no doubt that without ERDF co-financing, broadband access networks **would not be developed by private operators** in several remote and disadvantaged areas. In some of these areas there would be no broadband network at all, as such projects are not economically feasible. Moreover, it shall be stressed that even in deprived areas where telecommunications operators would be willing to develop broadband network without EU co-financing, this process would be **much less dynamic**. It could last up to 8-10 years, while projects under OPDP action 1.1 are usually completed within two years.

5.4 Conclusions and lessons learnt

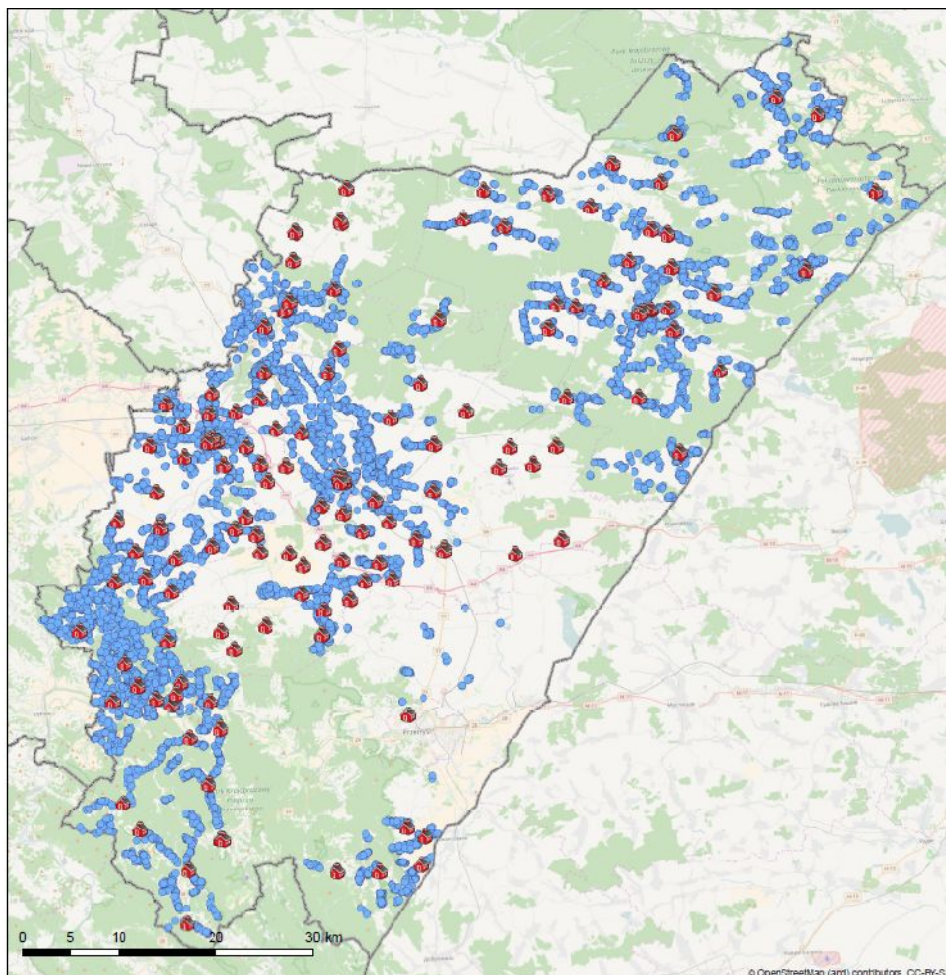
Rolling-out next-generation broadband networks is a key objective of the EU, national and regional digital strategies, with specific targets set for the 2020s. This ambition should play an important role in fuelling regional economic development, counteracting problems related to out-migration of the youth, and creating a base for smart solutions for individuals, companies and authorities (e.g. within the framework of smart city concept). The **ongoing deployment of broadband networks in Podkarpackie can be considered as a success**, largely derived from a capacity to address issues that were previously identified in the country during the 2007-2013 period. It highlights the **potential for policy-learning** regarding broadband infrastructures in the context of Cohesion Policy. It also brings valuable lessons for other EU regions, especially those facing issues that are similar to Podkarpackie (e.g. limited economic development, white dots...).

Critical conditions for the success of the case study are indeed manifold. **Stakeholders' involvement in the planning and development phase of the programme and projects** is a major element underpinning the positive outcomes observed. In particular, this case study proves that implementation of non-standard, specific type of **public-private partnerships** may be an efficient way to provide broadband infrastructure coverage to remote and deprived areas. The national coordination of the broadband projects deployed ensures that **sufficient technical and administrative capacities** are fulfilled, avoiding problems that have been identified with local authorities during the 2007-2013 period. Moreover, **regional and local authorities are still strongly involved**, ensuring a smooth delivery of broadband development and future use by the population and businesses. The business model in which **telecommunications operators become the owners of the broadband infrastructure** after completing the project is quite efficient regarding risk sharing between private and public bodies and makes operators more focused on attracting as many end-users as possible. As a result, the operators conduct market analyses and try to gather declarations of interest from the individuals to be connected to the new broadband network even before the investment is launched in the field.

Using the deployment of broadband infrastructure as a tool to counteract digital divide by **providing complementary and synergetic activities** – e.g. educational schemes to individuals who are or may be digitally excluded – should be encouraged. These synergies encompass other actions within the OPDP, which are aimed at the development of Information Society. However, there are also other public policies, which are positively influenced by this ERDF co-financed intervention. In the case study, some attention was for instance put on the National Education Network, which is expected to enhance learning processes in schools.

5.5 Appendix

Map 8: Map of households (blue dots) and educational institutions (red buildings) to be covered in the przemyski NUTS3 region in the second round projects under OPDP action 1.1.



Source: UKE, Podregion 34. https://cppc.gov.pl/wp-content/uploads/obszar_3_3_18_34.pdf

5.6 List of interviews

INSTITUTION/ENTITY	ROLE	DATE OF THE INTERVIEW
Centre for Projects Digital Poland	Director	14/02/2018
Development of Regional Cooperation, Department of Regional Programs, Orange Polska	Head of the Broadband Programme Department	09/02/2018
FHU COMP-SERVICE, the telecommunications operator in the Podkarpackie region	Owner	09/02/2018
FHU WAVE-NET, the telecommunications operator in the Podkarpackie region	Owner	12/02/2018

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6. CHEQUE TIC (MURCIA, SPAIN)



6.1 Introduction

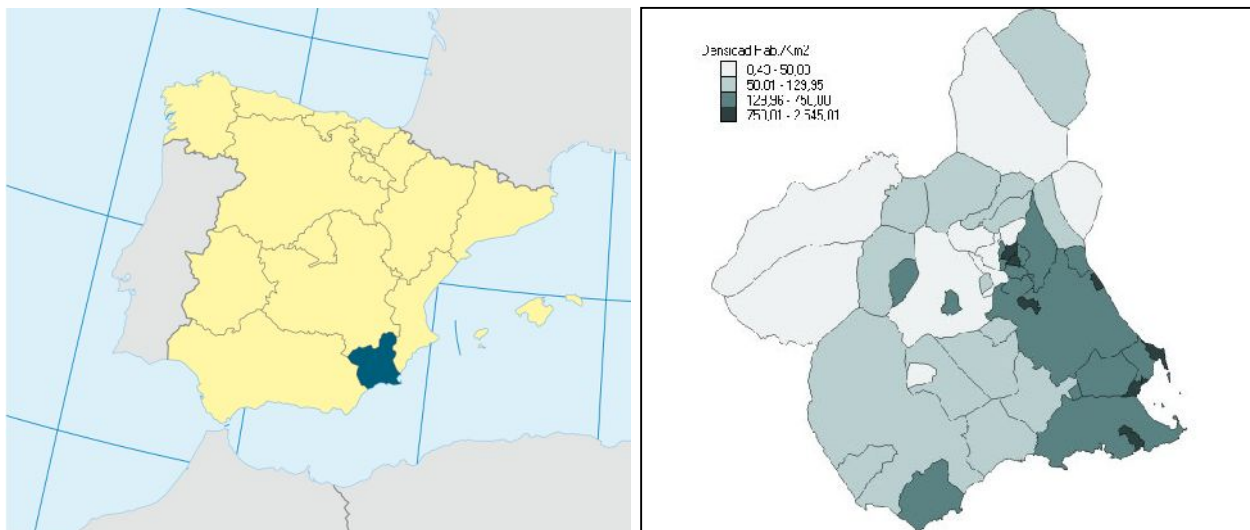
Cheque TIC is an Innovation Vouchers for the delivery of ICT services to SMEs located in the Region of Murcia, south-eastern Spain. This project had been selected as a case study because it provides insights on several elements that are critical to review how Cohesion Policy can contribute to the Digital Agenda's objectives:

- It is a **successful example of financial and technical support for the introduction of ICT** services in a critically under-digitalised region.
- It provides interesting **insights on an innovative funding method**. The adopted administrative procedure shifts the justification burden from the beneficiaries to the service providers. It enables a rapid delivery and very low administrative costs.
- It is an example of **fruitful collaboration between policymakers and local stakeholders**. Even though the original idea was conceived by the managing institution (Regional Development Agency), *Cheque TIC* features were fine-tuned with the help of local stakeholders.
- It shows **synergies with other EU policy frameworks**, especially Smart Specialisation Strategy: potential beneficiaries receive higher grants if they comply with Murcia RIS3.

6.2 Strategic and policy framework

6.2.1 Territorial needs

The Region of Murcia is an autonomous province (*Comunidad Autonoma*) located in the south-east of Spain, at the Mediterranean coast. It covers a surface of 11 314 km², which represents 2.2% of Spain's territory. According to INE (*Instituto Nacional de Estadística*), the total regional population is 1 470 273 inhabitants, i.e., 3.1% of the total Spanish population. At the administrative level, the region of Murcia consists of a single province, thus the region and the province operate as one unit of government. According to EUROSTAT (2017), Murcia is defined as an intermediate region between urban and rural regions. In 2016, 47% of regional population lived in the two main cities (Murcia and Cartagena), which are by far the most populated of the 45 municipalities of the Region. The remaining 34% of the population lives in rural areas, according to the Regional Government data.

Figure 15. Murcia location in Spain and population density.

Source: Authors (left) and Region of Murcia (right).

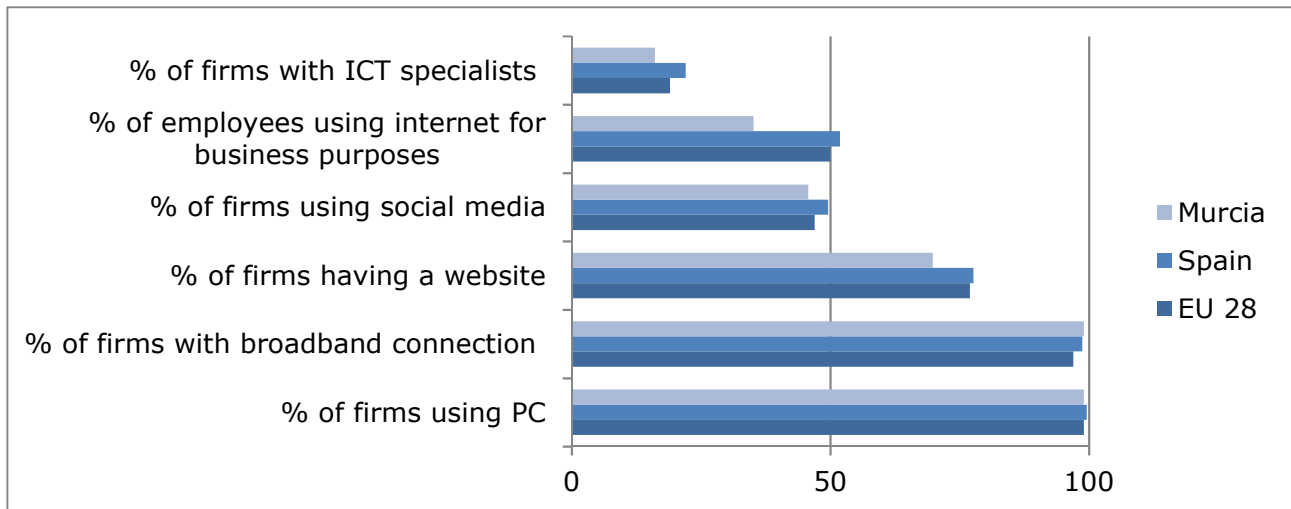
The Regional GDP in 2016 amounted to EUR 29 171 155, which represents 2.61% of National GDP. From 2013 to 2016, Murcia economy outperforms the national one in terms of annual GDP growth: in 2015, the annual % increase in Murcian GDP was 6.2%, significantly higher than the national value (3.2%). The region is finally recovering from the effect of the economic crisis of 2009 when GDP plunged by 4.6%. Yet, this economic recovery is not fully mirrored in a significant increase in Per Capita GDP, which remains below the pre-crisis figure. According to INE, regional GDP per capita amounted to EUR 19 855 in 2016, 17.5% below the national average and 35% below EU value expressed at PPS. This is mainly due to the fact that low productive sectors (such as agriculture, construction, and hostelry) have a significant share in Murcia's economy. The agricultural sector accounts for 4.9% of GVA, employing 13% of local workforce (which is respectively the double and the triple of national average). That being said, Murcia productive structure follows the pattern of an advanced economy, as the services sector made up to 65% of GVA.

According to the Regional Statistic Office, there are 93 757 enterprises located in Murcia. 95% of them are micro-enterprises, with less than ten employees. More specifically, 55% of them are individual enterprises with no other employees. These data are in line with the National average. Over 76% of firms operate in the services sectors, where the predominance of individual enterprises is outstanding (67% of total). According to Global Entrepreneurship Monitor (2014), Murcia has a dynamic entrepreneurial environment recording a TEA⁶⁵ of 6.5%, higher than the national average. On the other hand, the majority of newly created business consists of individual and micro-enterprises which often have a poor survival rate. According to the assessment of needs carried out in the Murcia OP, **just a minority of local enterprises have productivity level in line with national average.** The rest of firms are usually micro-enterprises with a poor impact in terms of Gross Value Added. Local firms seem to struggle to enter international markets, as there are only 1 252 regular exporters in 2011 with an average volume of EUR 4 049 (23% lower than the national average). In addition, **Murcia's enterprises lag behind EU and National average as far as concerns innovation (R&D) and ICT use** (see next paragraph). The overall under-productivity of local enterprises has been a major concern for policymakers who have launched several initiatives to tackle this issue. The low productivity of Murcia's enterprises is reflected by a **poor ICT penetration and**

⁶⁵ TEA (Total Early-Stage Entrepreneurial Activity) assesses the percent of working age population both about to start an entrepreneurial activity, and that have started one from a maximum of 3 years and half.

digitalisation performance. Figure 16 below shows selected indicators of ICT use in Murcia enterprises employing more than ten people.

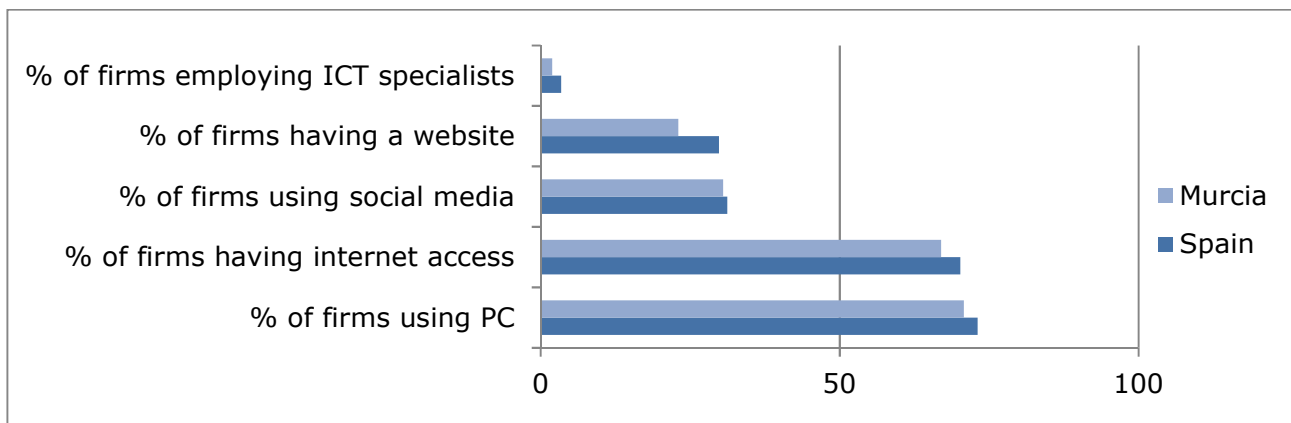
Figure 16. Digitalisation indicators (firms >10 employees) (2015)



Source: Eurostat and INE (2016).

With the exception of basic indicators (such as broadband connection and PC use), **Murcia consistently lags behind both the National and the EU 28 average.** In particular, Murcia firms are underperforming in terms of website use and ICT specialist employment, which shows that the ICT penetration is superficial. If only **enterprises with less than ten employees** are considered, the level of **digitalisation is even poorer**, remaining below the national average.

Figure 17. Digitalisation indicators (firms < 10 employees) (2015)



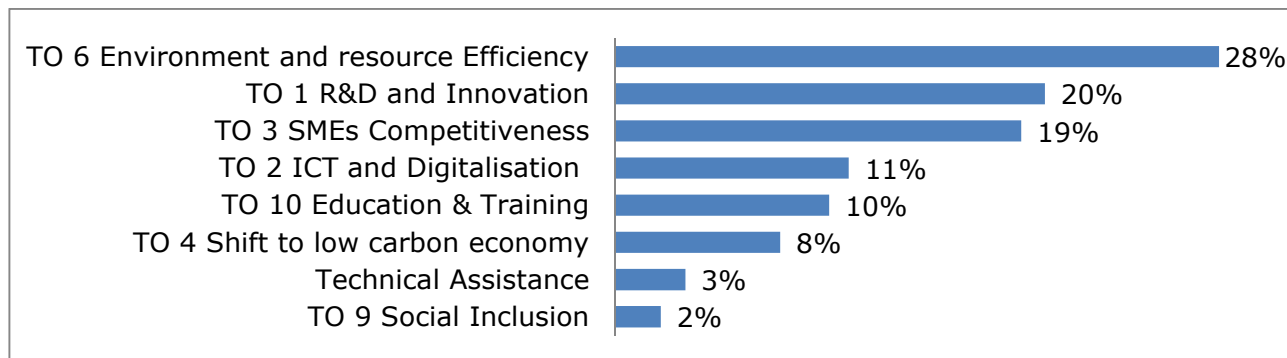
Source: INE (2016).

6.2.2 Local strategic and policy context

Cheque TIC is included in Murcia - Operational Programme 2014-2020, financed by ERDF and managed by the Regional Government. Its strategic priority and the allocation of funds are based on an assessment of regional needs, as it emerged from *Plan Estratégico de la Región de Murcia* (2014-2020) [Regional Strategic Plan]. In addition, the strategy for the ERDF OP has been elaborated having regard to EU 2020 Strategy, Council Recommendations, CSRs (Country Specific Recommendations) and the National Reform Plans. Finally, to create possible synergies, other EU-funded programme (such as ESF OP and RDP) has been taken into consideration.

The total ERDF funds for the Murcia OP 2014-2020 amounts to EUR 301 405 884⁶⁶, allocated to 7 priority axis corresponding to EU 2020 thematic objective. Figure 18 below shows the breakdown per thematic objectives⁶⁷.

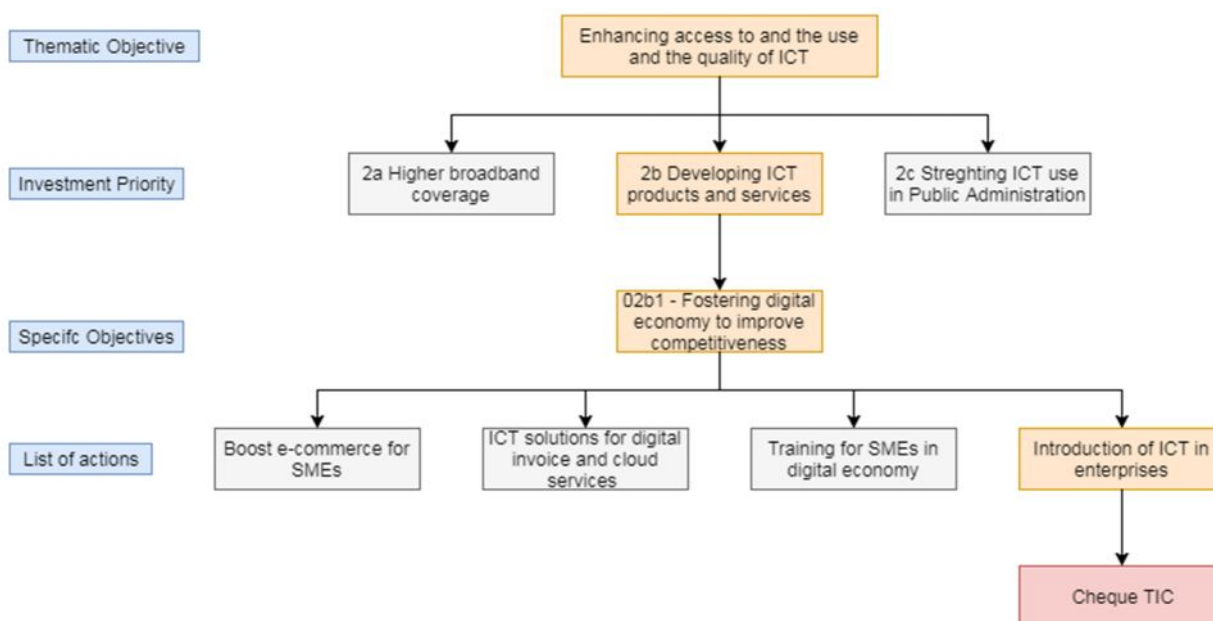
Figure 18. Budget allocation for TOs in Murcia 2014-2020 OP



Source: Murcia OP 2014-2020.

The highest share of funds goes to TO 6, which aims at reducing the environmental impact of local activities. On the other hand, it is interesting to notice that 50% of ERDF funds are allocated to the TOs dealing with SMEs. This reflects their relevance in the local economy. The **Cheque TIC initiative is included in the Priority Axis 2, which addresses TO 2**. Specifically, Cheque TIC is indicated as one of the actions envisaged under Investment Priority 2b, which contains the Specific Objective 2b1 'Fostering digital economy in order to increase competitiveness and internationalisation of Spanish enterprises'.

Figure 19. Integration of Cheque TIC in ERDF OP Murcia 2014-2020



Source: Authors based on ERDF OP Murcia.

⁶⁶ EUR 5 000 of the total budget had been transferred to the National Operational Programme « Strategy for SMEs ».

⁶⁷ In Murcia OP, there is a substantial convergence between priority axis and thematic objectives. Each T.O. is included in only one priority axis.

Even though the *Cheque TIC* is mentioned only under this Specific Objective, there are significant synergies with other TOs and policies. First, TOs from 1 to 3 are highly interconnected as far as support to digitalisation in local enterprises is concerned. TO 1 boosts their cooperation with research centres in activities including ICT and digitalisation. Indeed, these are the fields in which innovation and technological development are more relevant. In addition, TO 3 includes specific objectives aimed at improving SMEs competitiveness by fostering their cooperation in innovation activities supported by ICT technologies. Finally, significant synergies emerge with the Smart Specialisation Strategy for Murcia which promotes entrepreneurship and knowledge transfer, especially in R&D. Thus, the *Cheque TIC* is not a spot measure. On the contrary, it is deeply interconnected in an overall policy framework which highly prioritises ICT, both as sector itself (TO 2), and as a horizontal priority (TO 1 and TO 3). It is worth noticing that this focus on ICT goes beyond enterprises. Indeed, TO 2 lists a set of objectives aimed at extending broadband coverage for households, reducing the digital divide in deprived areas. Again, we find an **alignment with RIS3 priorities related to human capital development and knowledge network**. Finally, ICT related actions are also mainstreamed in actions included in TO 10. In this case, ICT are used to support educational and training initiatives.

6.3 Main features of the selected project

6.3.1 Description

- *Project description and management*

***Cheque TIC* is one of the several Innovation Vouchers promoted by the Region Murcia**, which include *Cheque Sistematizacion* and *Cheque de Innovacion* managed by the Regional Development Agency of the Region of Murcia (*Instituto de Fomento de la Región de Murcia INFO*). The direct **beneficiaries for *Cheque TIC* are SMEs located in Murcia** which can apply for the delivery of a set of ICT services included in the *Cheque TIC* portfolio. These services are **supplied by accredited providers** selected by *INFO*. In order to be eligible, providers should be private organisations or freelancers with sound expertise and experience in ICT⁶⁸. Public research institutes are explicitly excluded. Each accredited provider can deliver up to 5 *Cheque TIC* funded services. Accreditation is granted to select employees, not the whole institution: this guarantees that *Cheque TIC* services are provided by qualified professionals⁶⁹. **The budget for *Cheque TIC* – which amounts to EUR 800 000 for the 2017 call – is 80% co-financed by ERDF**, while the remaining 20% is funded by the Regional budget. The project *Cheque TIC* is managed by *INFO*, which designs the portfolio of services, selects the providers, and advises potential beneficiaries on the most suitable ICT solution. *INFO* coordinates its effort with *TIMUR* (Employee Association for TIC sector in Murcia), *CENTIC* (Murcia ICT Technological Center) and the Regional DG for EU funds (*Dirección General de Presupuestos y Fondos Europeos*). The collaboration with *TIMUR* is aimed at adjusting the portfolio of ICT services to the local SMEs needs. *CENTIC* plays the role of scientific advisor while the cooperation with the DG for EU Funds ensures an adequate budget.

- *Milestones and timeline*

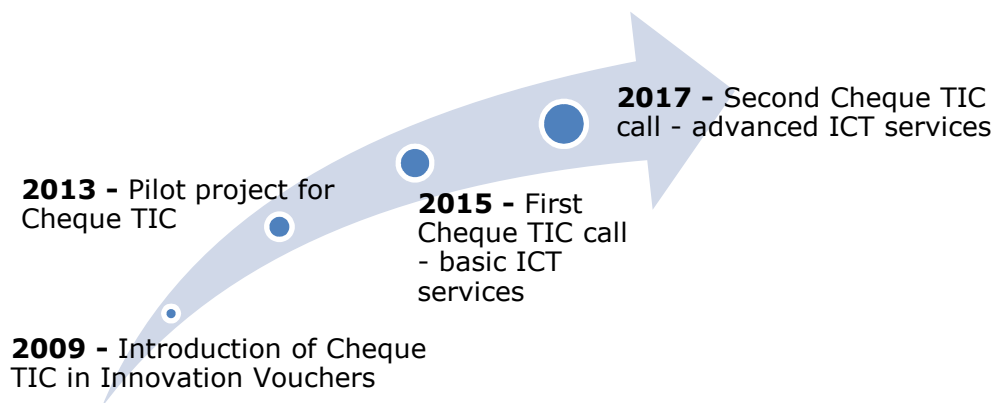
The *Cheque TIC* was originally included in a broader Innovation Voucher programme launched in 2009. At the time, there was no ICT specialisation, and these vouchers mainly addressed

⁶⁸ In order to be eligible, private organisations shall have provided at least 5 ICT related services in the last 3 years.

⁶⁹ Team leader should have a degree in a relevant field of study (computer science or engineering).

general innovation themes in SMEs. As most of the application for this broad Innovation Vouchers concerned ICT, the Region – in line with enterprises expressed needs – decided to launch a pilot version of *Cheque TIC* in 2013 with a total budget of EUR 300 000. The uptake of the project was successful, with more than 480 applicants, 44 assigned vouchers, and 18 providers approved. **The success of the pilot project case led to the first *Cheque TIC* call in 2015, with a total budget of EUR 762 000.** The list of services comprised in *Cheque TIC* 2015 includes **basic ICT application** (such as digital Business Process Management BPM and Customer Relationship Management CRM tools, web design...) and was mostly addressed to enterprises with no previous exposure to digitalisation⁷⁰. The uptake was again successful, with 103 vouchers assigned to over 458 applicants. Most of the financed projects concerned e-commerce (EUR 225 000), and were especially addressed to micro-enterprises. **The most recent *Cheque TIC* call was launched in December 2017, with a total budget of EUR 800 000.** Unlike the previous programme, the 2017 *Cheque TIC* **mostly focused on advanced ICT services** (such as IoT, e-cloud, Big Data) and targeted enterprises with some digitalisation experience⁷¹.

Figure 20. Project Timeline



Source: Authors based on INFO Region Murcia.

6.3.2 Project cycle

The very first *Cheque TIC* programme (included in a broader Innovation Voucher project) was designed by the *INFO* with a top-down approach aimed at assessing the poor performance of local enterprises regarding ICT penetration. Thus, there was no local stakeholders' involvement neither in the idea nor the design of the original project. On the other hand, after the first round calls in 2009, local stakeholders (especially business associations) interacted with *INFO* to fine-tune the 2013 pilot project. In particular, consultation with potential beneficiaries was helpful to individuate the most requested ICT services. This cooperation was at work also for the selection of services included in the following calls. Indeed, the successful project's uptake is due to the fact that services supported by the *Cheque TIC* grant are adapted to SMEs needs.

According to the *INFO*, **one of the success factors of *Cheque TIC* is its smooth procedure. Applicants select one service** included in the portfolio and file the request for *Cheque TIC* to *INFO*. If successful, ***INFO* provides the applicants with a check** which might cover up to 75% of total eligible costs, depending on the typology of services⁷². Successful applicants **turn the check to the most suitable service provider**, paying only the difference between the amount of the grant and the total cost of the service (plus VAT). Then,

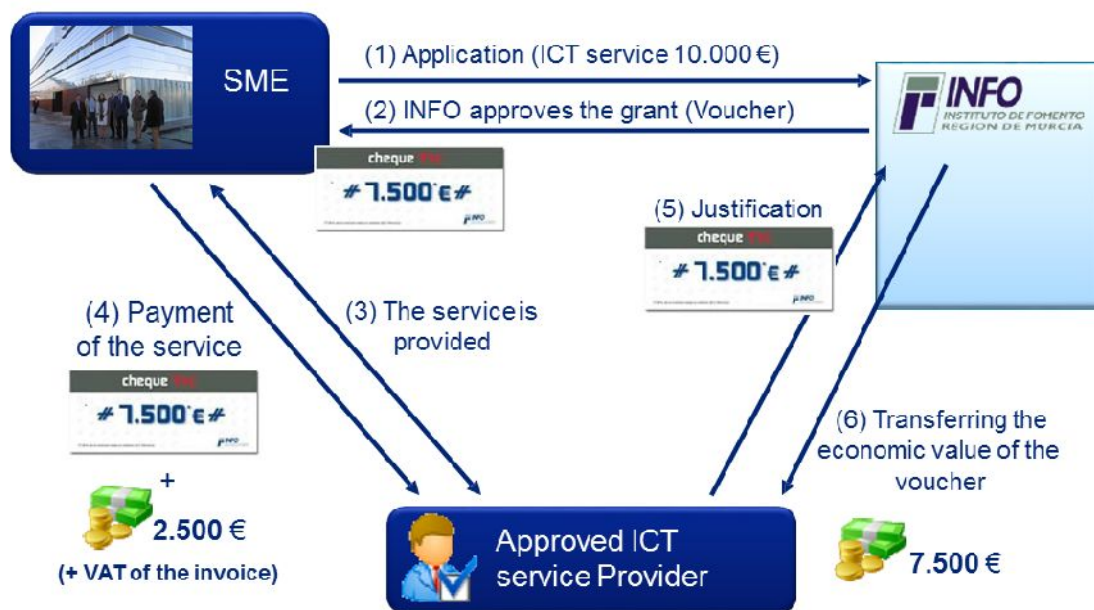
⁷⁰ See Appendix for an exhaustive list of services included in *Cheque TIC* 2015.

⁷¹ See Appendix for an exhaustive list of services included in *Cheque TIC* 2017.

⁷² In the 2017 call, the maximum costs range from EUR 16 000 for Big Data services to EUR 6 000 for cybersecurity.

providers return the check with the justification documents to **INFO** in order to receive the payment. This smooth procedure speeds up the service delivery shifting the justification burden to the accredited providers. On the other hand, providers benefit from simplified procedures, which enable them to provide the same paperwork for more than one client. In order to guarantee the highest uptake, **INFO carries out an active promotion with ad-hoc advertising materials**. The use of BPM software in dealing with the applications for *Cheque TIC* further speeds up the procedures. Finally, there is a **significant synergy with the Smart Specialisation Strategy**: if an applicant complies with Smart Specialisation Strategy priority, the financial support is higher.

Figure 21. *Cheque TIC* Project Cycle and stakeholders involvement



Source: Instituto de Fomento de la Región de Murcia (INFO).

Quantitative macro results are not available yet. According to *INFO*, it is too soon to appreciate concrete results regarding a significant advance in the digitalisation of target indicators for Murcia's SMEs. As concerns the quantification of expected results, the ERDF Murcia only provides targets on e-commerce (to be used by 33% of firms in 2023). Thus, the number of filed applications for *Cheque TIC* can be a good proxy to evaluate the project effectiveness. In 2015, there were **458 applications resulting in 103 assigned vouchers** with an average value of **EUR 7 402**. The last call is likely to record an even higher number of applications. As said, these figures proved that the local enterprises find *Cheque TIC* as a helpful tool for their digitalisation strategy. As a consequence, ***Cheque TIC* has been internationally promoted as a good practice in the field of SMEs digitalisation**. For instance, similar initiatives had been launched in Catalonia (*Cheque Catalan*), Extremadura (*TIC Extremadura*), and Friuli Venezia Giulia (*Sovvenzione ICT*). Thanks to the success of *Cheque TIC*, *INFO* – together with other four partners⁷³ – is leading the **Innovoucher project under the Horizon 2020 strategy** whose objective is to develop a new model of innovation voucher programme

⁷³ The other partners in the Innovoucher Consortium are: SVIM – Sviluppo Marche SpA (Marche, Italy), The Polish Agency for Enterprise Development (Poland), Executive Unit for Financing Higher Education, Research, Development and Innovation (Romania), Enterprise Flanders (Flanders, Belgium). For further information visit <https://www.innovoucher.eu/main/index.php>

supporting the transnational exchange of innovation services in Europe. In particular, these vouchers aim at setting up the creation of transnational vouchers, developing a European label for innovation vouchers, fostering the innovative approach of these vouchers, spreading good practices and increasing the diversity of services included in Innovation Vouchers. The first pilot call was published on 15th of March 2018, with a total budget of EUR 600 000 for a maximum of 25 beneficiaries. As said, the objective of the call is to enable SMEs and their associations to acquire knowledge, technology and innovation services supplied by accredited providers located in the EU. Beneficiaries must be located in one five region included in the Innovoucher Consortium. INFO will be the Managing Authority of the Innovoucher call for SMEs located in Murcia.

Given its previous successes, the project Cheque TIC is highly likely to continue in future.

6.3.3 Contribution to the strategy in place and the Digital Agenda for Europe / Digital Single Market

The *Cheque TIC*'s contribution to the Digital Agenda and Digital Single Market is threefold:

- *Cheque TIC* efficiently **supports the introduction of ICT services** in local firms, especially for small and micro-enterprises which are the main beneficiaries of the project. Besides the financial aid, significant benefits also arise in terms of time savings. Local enterprises seize the opportunity created by the *Cheque TIC* bringing forward planned investments. According to one beneficiary, *Cheque TIC* allowed a time saving of 10% - 30%. This is a significant aspect, as ICT is a fast-changing field and a delayed intervention can rapidly become outdated.
- The introduction of *Cheque TIC* **supported the creation of an active market for ICT services** in the Region. The criteria for the selection of providers were designed in order to maintain a competitive market. A significant difference with OECD Innovation Vouchers definition is that providers should be private institutions. Thus, public knowledge providers are excluded. This criteria – together with no limitation on firms location and size – guarantees that the *Cheque TIC* is framed in a competitive market with no external distortion. Moreover, the maximum of 5 *Cheque TIC* per accredited provider reduces the risk of monopolistic behaviours. Even though this regulatory framework is not supposed to support any specific category of firms, most of the 114 accredited providers are Murcian or Spanish SMEs. This is explained by the fact that the relative small amount of *Cheque TIC* (EUR 7 402) is not very attractive for bigger ICT companies.
- The introduction of Cheque TIC **raised awareness in digitalisation and innovation** in the local business environment. Indeed, the exhaustive list of services included in Cheque TIC enables local enterprises to know the possible added value of ICT in their business. *INFO* supports the beneficiaries in the selection of the most appropriate service.

The success of *Cheque TIC* is expected to boost the digitalisation of Murcian enterprises, yet its macro-effects will not be evident in the short term. *INFO* proved to have a sound administrative capacity in both project management and ICT knowledge. Its project management expertise has been somehow confirmed by the success of Cheque TIC and the leading role of *INFO* in the broader Innovoucher programme. *INFO* proved to have familiarity with ICT as the list of services included in the portfolio is well designed. On the other hand, *INFO* relies on the capabilities of stakeholders. It considers that the objective of stimulating ICT progress in the region cannot be reached through a purely top-down digitalisation strategy.

6.3.4 Success factors, limitations and other issues

Two main success factors can be identified:

1. **Cheque TIC is effectively tailored to local needs enhancing ICT awareness in local business.** Indeed, local SMEs might fail to internally assess their ICT needs. By providing an integrated portfolio of services, *INFO* directs potential beneficiaries towards the most suitable solution. This feature is particularly helpful, as the local business environment is characterised by micro and small enterprises with poor or no knowledge of ICT application in business. In addition, the relatively small amount of the *Cheque TIC* grant led only SMEs to register as providers, resulting in a higher share of regional SMEs in the list of accredited providers. Indeed, when designing the portfolio of services (especially for 2015 and 2017 calls), *INFO* coordinates efficiently with relevant stakeholders (both providers and beneficiaries) to deliver solutions in line with territorial needs.
2. **The smooth administrative procedures encourage the application for *Cheque TIC*.** As previously described, beneficiaries are exempted from the justification procedures, and they can immediately turn the check to a provider. This light and fast procedure shows concrete results for the beneficiaries in the short term.

The support of the ERDF was essential as it provided 80% of the budget allocated to the *Cheque TIC*. Besides the financial support, the integration of *Cheque TIC* in ERDF OP allows **important synergies with other EU programme such as the Smart Specialisation Strategy**.

6.4 Conclusions and lessons learnt

The *Cheque TIC* project provides an **example of innovative support to SMEs digitalisation**, bringing key lessons for other EU regions. Even though it is too soon to assess appreciable macro-effects (in terms of digitalisation indicators), the high number of applicants seems to confirm a strong interest in the uptake of this instrument. **The adaptation to the local challenges in terms of digitalisation and the smoother administrative procedures of the *Cheque TIC*** allow SMEs to benefit from support in an area where they tend to lag behind other companies. Indeed, Murcia is still below the national average in terms of digitalisation indicators and its SMEs struggle to compete in the context of an increasingly technology-driven economy. The advantage of the *Cheque TIC* is also to simultaneously favour demand of ICT services by companies and supply by providers, and thus contribute to develop a regional market in this field.

This case study shows that Cohesion Policy can successfully serve as a **framework to develop innovative instruments**, such as innovation vouchers, to foster the digital transition of SMEs. It requires concertation with potential beneficiaries to tailor the offer to their specific needs. Finally, the **EU context enables interesting prospects for further developments**, such as the contribution of the region to the Innovoucher project under the Horizon 2020 strategy (transnational exchanges of innovation services). It thus also serves as a vector of greater political visibility for regional stakeholders.

6.5 Appendix

Table 4. Portfolio of ICT services in 2015's Cheque TIC

CODE	TYPE OF SERVICES	SERVICES	MAX. GRANT
TIC 1	ICT Services for internal business processes	ERP (Enterprises Resource Planning) Tools	EUR 8 000
		BPM (Business Process Management)	EUR 8 000
		CRM (Customer Relationship Manager)	EUR 8 000
TIC 2	ICT Services for e-commerce	On-line store	EUR 8000
		Social media marketing	EUR 8 000
		E-sales analysis tools	EUR 8 000

Source: INFO (2015), *Cheque TIC leaflet*.

Table 5. Portfolio of ICT Services included in 2017's Cheque TIC

CODE	TYPE OF SERVICES	SERVICES	MAX. GRANT
TIC 11	Big Data Planning	Supporting the planning of Big Data use with the objective of improving information management	EUR 16 000
TIC 12	Cyber-security projects	Improving Cyber-security in SMEs in order to better protect business and users	EUR 6 000
TIC 13	Validation of IoT (Internet of Things) Projects	Supporting enterprises which already uses 4.0 technologies in order to improve their productivity	EUR 12 000
TIC 14	Set up of BPM (Business Process Management)	Set up BPM to automatize standard procedures	EUR 16 000
TIC 15	Set up of CRM (Customer Relationship Management)	Set up CRM to improve relations with clients	EUR12 000
TIC 16	Set up of BI (Business Intelligence)	Tailored services to better manage business information	EUR 12 000
TIC 17	Set up of collaborative designing and modelling systems	Self-explanatory	EUR 16 000
TIC 18	Set up of integrated R&D tools	Self-explanatory	EUR 12 000
TIC 21	Strategical ICT planning for international markets	Tailoring ICT tools to increase international competitiveness	EUR 4 000 (for strategy consultancy) EUR 12 000 (for the setting up of specific tools).

Source: INFO (2017), *Cheque TIC leaflet*.

6.6 List of interviews

INSTITUTION/ENTITY	ROLE	DATE OF THE INTERVIEW
Instituto de Fomento Region de Murcia (INFO)	Head of Innovation Department	22/02/2018

6.7 References

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This study provides a critical analysis of the contribution of Cohesion Policy and the European Structural Investment Funds to the Digital Agenda for Europe and the Digital Single Market. Based on the analysis of past and current patterns of ESIF digital investments and selected case studies, this study shows that Cohesion Policy should concentrate where its added value is highest, i.e., on support to the formulation of effective regional digital strategies and on the promotion of partnerships between relevant stakeholders, at regional level and beyond.

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