

Developing digitalisation and Industry 4.0 in Centro Region of Portugal

ACTION PLAN

November 2020

President of NERSANT Statement

Today, we look at Centro Region and see a regional market unique in Portugal, with lower employment rate compared to previous years and a more dynamic economic activity. Well, at least before the COVID-19 outbreak that brought globally long-lasting implications to the way companies, citizens and academic institutions relate with each other. The pandemic has showcased the value of digital operating models and is likely to force many companies to speed up their digital innovation and transformation.

Since the beginning of FUTURE ECOM project NERSANT expected a deep experience in a learning and sharing environment within the partnership. An experience that will greatly contribute to build a more sustainable future in the economic and knowledge society in Centro Region.

This Action Plan represents a compromise with the territory with a vision that we want to project abroad, strengthening the connection in the innovation ecosystem. It is a plan where regional players, but also institutions at national level with activity in digital areas, will have a role reconverting careers and qualifications, industries and support innovation.

As President of NERSANT, I would like to thank all European partners and those involved in the Local Group of Stakeholders for their kindness, open mind and sharing. We are committed with the implementation of the Action Plan and with our territory in a journey that we will progress together.

Domingos da Silva Chambel

President of NERSANT Board

CCDRC Statement



Centro Regional Coordination and Development Commission (CCDRC) as the Managing Authority of the Regional Operational Program for Centro Portugal – CENTRO2020, and also as a member of the Local Group of Stakeholders, supports NERSANT as FUTURE ECOM partner of Centro Region.

CCDRC has participated in several meetings of the Local Stakeholder Group during the FUTURE ECOM project.

The Action Plan results and brings together the contribution of all the stakeholders involved and is a great working tool for the development of the Region as a whole.

In this context we fully support the Action Plan submitted by the NERSANT in the context of the Interreg Europe project FUTURE ECOM.

Coimbra, _ November 2020

Sincerely yours,

Isabel Damasceno Vieira de Campos Costa

President of Centro Regional Coordination and Development Commission

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Part I – General information

Project: Future Ecom - Exploiting digitisation to increase B2B e-commerce

Partner organisation: NERSANT – Business Association of Santarem Region

Country: Portugal

NUTS2 Region: Centro

Contact person: António Manuel de Campos

email address : ce@nersant.pt

phone number: 00351 249 839 500

Part II – Policy context

The Action Plan aims to impact:

- Investment for Growth and Jobs programme
- European Territorial Cooperation programme
- Other regional development policy instrument

The policy instrument addressed is the Regional Operational Programme for Centro 2014-2020 Thematic Objective 1 - Strengthening research, technological development, and innovation

With 100 municipalities and 2.217 million inhabitants in 2019 (INE – Annual Estimations of Resident Population, Source: PORDATA), Centro Region concentrates 21.5% of the Portuguese population, having lost importance in population terms over the decades (between 2001 and 2011 there was a decrease of 0.9% and between 2011 and 2019 is expected a decrease of 4%). It is a Region with a low population concentration (78.6 inhabitants per km²), with a very aged population (about 201,4 elderly per 100 young people, corresponding to more than 25 % of the population of the Region) and negative natural population growth, due to the existence of higher mortality rates than birth rates, and there was no compensating migratory movement. In 2012, the GDP generated in the Centro Region was 30.3 billion euros, accounting for 18.4 % of the national GDP, constituting as the third Region of the country, after Lisbon and the North, in terms of contribution to national GDP. Regional GDP improved between 2009 and 2010 (2.1 %), worsened in 2011 and 2012 and improved again till 2018 representing 38 billion euros GDP accounting for 18.7% of national GDP. GDP per head in the Centre represented 8 % of the country's average and, in 2018, there was 0.6% increase.

The Centro Regional Operational Programme 2014-2020 (CENTRO 2020), the financial instrument that aims to support regional development in the NUTS II Centro of Portugal, is part of the Portugal 2020 Partnership Agreement and of the current cycle of Structural Funds provided by the European Union. The CENTRO 2020 aims to achieve a smart, sustainable and inclusive growth and to the economic, social and territorial cohesion. The financial envelope for CENTRO 2020 includes a 2.155.031.031 EUR, 1.738.125.002 EUR from EFDR and 416.906.029 EUR from ESF. The reprogramming in 2019 reduced ESF funding because of low funding execution but kept the focus on the human capital with the increase in educational equipment (EFDR). Besides other thematic operational programs, aiming to implement the vision and strategy described in CENTRO 2020 regional development strategy, as well as the assumed options in the Regional Smart Strategy for Research and Innovation (RIS3). The CENTRO 2020 will contribute to promoting the competitiveness of the Centro Region 's economy and its sustainable development and internal cohesion. It will also boost the Region 's ability to contribute to the achievement of the key EU and national development priorities, such as:

- support competitiveness and innovation in SMEs;
- boost research and technical development (RTD) and innovation
- create sustainable and quality jobs and supporting labour mobility
- promote education and qualification
- promote sustainable urban development.
- support the shift towards a low-carbon economy

The following thematic objectives (TO) shall be supported by the operational programme:

TO 1 Strengthening research, technological development and innovation;

TO 2 Improving the access to ICT including its use and quality;

TO 3 Enhancing competitiveness of SMEs and agriculture sectors, fish and aquaculture;

TO 4 Supporting the transition for a low carbon economy;

TO 6 Preserving and protecting environment and sustainability of resources;

TO 8 Promoting sustainable and quality employment and supporting the labour mobility;

TO 9 Promote social inclusion and poverty reduction

TO 10 Investing in education, training and vocational training for skills and lifelong learning

TO 11 Improving institutional capacity of public authorities and stakeholders and efficiency of public administration.

The TO 1 includes the following investment priorities:

1a – Strengthening of infrastructure research and innovation (R & I) and capacities for developing excellence in R & I matter, as well as promotion of competence, in particular those of European interest

1b – Promotion of investment companies in R & D, development of links and synergies between companies, research centres and development and the higher education, in particular promotion of investment in the product development and services, in the transfer of technology, social innovation, eco-innovation, in applications of public interest, in the stimulation of search, in networks, clusters and in open innovation through smart specialisation, and support technological research and implemented, pilot lines, early validation of products, advanced production capacities and first production, in particular concerning facilitating technologies essential, and the dissemination of technologies of general interest

In what concerns FUTURE ECOM, the policy instrument addressed is the TO 1 *Strengthening research, technological development and innovation*, aiming to:

- i) Strengthen the regional research and innovation infrastructure, promoting competence centres;
- ii) Promote business investment in research and innovation developing linkages between businesses, R&D centres and higher education, promoting investment in the development of products and services, technology transfer, social innovation, eco-innovation, public service applications, demand-driven innovations, networking, clusters and open innovation through smart specialization, as well as supporting applied research.

The draft of the actions included in the regional Action Plan hereby presented has met the following principles:

- (i) Challenges and needs identified were discussed with regional stakeholders during Local Stakeholders Group meetings organised during FUTURE ECOM phase 1;
- (ii) Lessons learnt during interregional exchange and learning activities were inspirational for the regional Action Plan;
- (iii) The actions aim at achieving improvements in the specific policy instrument selected for Centro Region;
- (iv) To increase the feasibility of implementation a limited scope and number of actions were drafted, building on top of an established number of stakeholders.

To improve the policy instrument, this regional Action Plan will focus on the following dimensions:

- Institutional capacity-building improvement in implementing policy instruments, through the collection, systematisation and make available information about initiatives implemented using policy instrument resources to the companies and the regional managing authority.
- Efficiency improvement through the involvement of the main regional stakeholders and beneficiaries of the policy instrument addressed, in order to produce relevant recommendations with impact in companies.

In the next section, we have built the actions in a coherent flow and regional needs, also inspired by the step by step process flow “on the way of Industry 4.0” presented in Lemgo (Germany) on the 15th may 2019.

Part III – Details of the actions envisaged

ACTION 1

Strengthening qualification and education offer to prepare SMEs for digitalization and Industry 4.0

“What competences do I need for digitization? How can I build this?”

1. The background

Before Future Ecom was planned and even started, job creation was a top priority of EU and of Portugal economy in particular. Unemployment in Portugal had peaked at an upsetting 18% in 2013, and thousands of qualified workers were forced to leave the country in search of new opportunities. Today, less than 5 years after, the situation has changed dramatically. Unemployment has halved to 6,7% in 2019 and is lower than in Finland, according to Eurostat, which nearly corresponds to a full employment situation. However, the demographic evolution conducted to an active population rate decreasing in 2019, contradicting the two previous years increase, according to the National Statistical Institute.

It is very common jobs offers that are not taken, including those for data analysts, coders, and others related with digital skills. This means that not only jobs are not created, but also companies lose competitiveness. This scenario might lead to great losses in revenues and, consequently, the technological innovation is interrupted

However, quantity of employment does not mean quality, as the GDP per capita of Portugal is still only 77% of the EU27 average. This explains why migration of qualified workers to the EU is still high. On top of this, a Centro Region has to compete with the stronger national economic centres of Lisbon and Porto, where large multinational companies such as Google & Amazon are pursuing major investments and hundreds of new jobs, increasing the “brain drain” to those centres.

These factors mean that the nature of the “jobs and skills” issue in Centro Region is not how to create more jobs, but how to improve the added-value and socio-economic wealth produced by the jobs created.

The present challenge of Centro Region at the edge of a major technological (all technologies associated with Industry 4.0) and societal change (globalization) is how to create conditions for local firms to be able to attract and retain a young ICT talent, and to develop at life long term new capabilities and skills in existent high skilled and motivated workers. Such a complex and present-day challenge cannot be addressed by traditional means expecting the traditional ways of education and qualification. In this case it means helping local firms to rethink the resources they need to innovate in a digitalized world and grow, and that may not be just those traditionally associated with functions like engineers, coders, etc., but other creative roles equipped with the necessary digital and business competences.

In the specific context of Industry 4.0 affected by the jobs and skills issue described before, the challenges are not merely technological, but also policy, regulation, ethics, social. According to the i4.0 Scoreboard (<https://cotecportugal.pt/pt/courses/scoreboard-i4-0/>) – a tool developed to measure the basic conditions and competitiveness of national SMEs in a context of Industry 4.0, through the synthetic index *i4.0 Index* (note: the i4.0 Index measures the performance of 18 countries of the European Union according to their basic conditions (Readiness) and the competitiveness of SMEs in the context i4.0 (Integration), consisting of 8 dimensions, evaluated with 35 indicators) – Portugal is positioned in the mid-tier countries in terms of performance in i4.0 context. Although the positive country evolution between 2016 and 2017 globally, several dimensions are still in a negative path showing a slower progression than the average of pairs:

- Digital Skills, at the level of both supply and application by companies, besides the contribution of the launch and implementation of initiatives such as Axis I measures of the Industry 4.0 Programme (The National Strategy for Industry 4.0 that the Portuguese Prime- Minister António Costa announced in 2017 identifies the Capacitation of Human Resources as one of six priority axes. It aims the requalification and training of 20 thousand workers in digital skills) and the national initiative in digital skills (INCoDe.2030);

- Operational and Business Model dimension decreased, due to a decrease in the results of most of its indicators, especially the SME indicator related with sells through a website or application – B2B and B2G.

Within the interregional project meeting in Detmold on the 15th May 2019, we visited good practices and were introduced to learning experiences for the policy change. The Weidmüller Academy, a global player partner in industrial connectivity, was selected as a good example. Besides its responsibility with their market in terms of financial stability, market growth and companies' independence, they also create added value through education and support to young talent. During the visit, Dr. Eberhard Niggemann, head of the Weidmüller Academy, used the example of his company to show what opportunities "Smart Production" and digital business processes offer and at the same time what demands it places on companies, particularly in terms of qualification of employees. The concepts brought by the Weidmüller Academy involve human resources development, vocational training, student academy, networks, new technologies, academic cooperation, and training centre, supported by networking knowledge and opportunities expansion. During the meeting, several issues were raised that concern our Region reality:

- young students needs inspiring practical experiences and vocational orientation in order to develop professional competences aligned with industry and their own motivation.
- training model includes employees in lifelong learning, using mixed methods (online, web based, face to face training) and human resources departments must be involved in the personnel development plan;
- academic cooperation and support (as stated during the meeting "we network knowledge") building networks with universities and institutes.

During Local Group of Stakeholders meetings and interviews, this vision was also shared. Companies are not prepared for challenges and opportunities of digitalisation that goes beyond e-commerce and involves advanced technologies such as robotics, IA, cybersecurity, etc. Companies lack skills and competences development that can leverage the existent technological landscape.

This Action will gather the knowledge mainly in terms of the engineering-related competences and skills base, as well as current and emerging educational trends. We will consider not only higher educational programs, but also lifelong learning programs and company-based tailored courses and programs, adopting a mix of educational strategies including live classes (on room class), distance learning (webinars, online) or on-job training. The actual strategy will depend on the course, students, contents as well as the results of discussions with all stakeholders. It includes a comprehensive documentation of training and educational contents available as well as the identification of gaps in order to identify and design promising initiatives. The longstanding experience of Weidmuller will be most valuable to understand which education and training strategies should be followed. This Action will contribute for strengthening education offer linked to digitalisation and Industry 4.0 sector in the innovation system of Centro Region. It is important to have an overview of higher education offer in Portugal, mainly in Centro, and also in other EU countries, taking as organisational best practice the model of Weidmuller.

At policy level, and in coordination with the regional managing authority (CCDRC), we expect to influence the way funding is being spend on new and ongoing innovation projects. Under the thematic objective 1 for the period 2014-2020, the qualification of research and innovation infrastructures, such as technological centres, technology transfer centres, new technologies institutes and science & technology parks is a strategic priority that must be in line with effective needs from industry. On the other hand, research and innovation projects demands cooperation between companies and scientific and academic institutions. Take into consideration both type of projects ongoing funded by the Centro ROP, we will work together with the managing authority – CCDRC – to:

- i) Propose new indicator to evaluate ongoing projects or even fund new projects in future calls: “number of activities for promotion of digital qualifications and skills development in industry and services sectors”. Having this indicator projects contributing for education of workforce, skills development and competences improvement of the actors in the industry and services sectors towards digitalisation will gain advantage in the selection process and in project evaluation.
- i) Identify recommendations of educational and training contents (cloud computing, dig data and data analysis, robotics, mobile computing, simulation and modeling, radiofrequency or RFID identification, physical cyber systems, 3D printing, among others) and methodologies (virtual training, on job training, lab experience, etc) that can benefit SMEs. These recommendations can be introduced in future calls as priority areas

2. Actions

The actions to be undertaken include the following:

Task 1 – Launch a survey across the ongoing research and innovation projects funded by the OP to identify the state of the art in terms of what activities have been implemented contributing for personnel qualifications and skills development. This task will be implemented in a two-step process:

- i) Organisation of one workshop with representatives from regional High Education Institutes, professional education schools and CCDRC to develop a survey;
- ii) Implement the survey withing project beneficiaries.

Task 2 – Collect and analyse survey results

Task 3 – Organise one workshop with representatives from regional High Education Institutes, professional education schools, COTEC and CCDRC to present survey results and gather comprehensive insights on gaps and needs to improve the qualification and education offer on digitalization.

Task 4 – Develop a recommendations report to introduce a new indicator and priority areas on evaluation of ongoing projects.

Task 5 – Together with CCDRC, it will be carried out an assessment of administrative constraints limiting the introduction of new indicators and priority areas, and decide on further activities such as testing the implementation of recommendations, and refinement or formalization of recommendations.

3. Players involved

The following organisations needs to be involved in the Region for the implementation of action:

- CCDRC as the managing authority responsible for managing research and innovation projects with private companies and research and innovation infrastructures.
- HEIs from Centro Region with existent skills in the sector (Polytechnic Institute of Tomar, Polytechnic Institute of Leiria, University of Coimbra and University of Aveiro); these are key organisations with specialised training and educational offer and formal skills development.
- COTEC, business association for innovation as owner of THEIA Model for companies' self-diagnosis of digitalization maturity level which allows the identification of critical areas in companies; COTEC is also the operational coordinator of the National Program Industry 4.0 "Strategy for Economy Digitalisation".

4. Timeframe

| | |
|---------------------------------|--------------------------|
| Task 1- Launch of survey | December 2020-March 2021 |
| Task 2- Survey analysis | March 2021-April 2021 |
| Task 3- Workshop | April-May 2021 |
| Task 4- Recommendations | May-July 2021 |
| Task 5- Assessment | July-December 2021 |

5. Costs

Internal costs of human resources. The measure will not represent a direct cost or expense to the administration involved.

6. Funding sources

No additional funding sources needed. Internal budget for meetings will be used.

ACTION 2

Creating a digital acceleration community in Centro Region

“How can I implement digitization in my company? How do I find the right partner for it?”

1. The background

Industry 4.0 and digitalization is well known for being a Research & Development & Innovation intensive topic and some of domains are at the forefront of knowledge (IoT, cybersecurity, integration of systems, virtualization and simulation, cloud computing, augmented reality, big data, additive manufacturing/3D printing, robotics). However, the industry that can benefit of these technologies in a connected value chain is quite heterogenous, with some sectors still lagging. The Centro Region economy is fairly differentiated including both low technology level industrial sectors (e.g. ceramics, glass, cement, forest industries such as wood, pulp and paper, agri-food), and some medium and high-tech sectors such as health services, biotechnology, telecommunications, new materials (particularly the moulds industry), ICT and renewable energies. However, in the last decade, between 2009 and 2017, Centro has shown a positive evolution in terms of ICT usage where several indicators show that companies, public services and citizens have increased in ICT usage, such as in electronic commerce, ICT activities, individuals using electronic forms to communicate with government, public services usage (eg. Municipalities using electronic commerce, companies with ICT activities, individual using electronic forms to communicate with government).

New technologies will require new competencies and skills which will be addressed in Action 1, but there are specific skills that must be outsourced. A market services is needed for those demanding support to implement a strategy and business models. To trigger new investments in the digitalisation of industry and support the creation of better framework conditions for the digital industrial revolution, European Commission created one-stop-shops that help companies to become more competitive regard to their business/production processes, products or services using digital technologies – the Digital Innovation Hubs (DIH). Based on existent infrastructures/competence centres, DIH provide access to knowledge, expertise and technology to support companies with testing and experimenting with digital technologies. DIH also provide other support services such as business and financing support. DIH aggregates an ecosystem consisting of research institutions, industrial technological centers, industrial associations, science and technology parks, incubators, and technology companies. Today, Portugal has 4 operational DIH, such as PRODUTECH, HUB4AGRI, iMan Norte Hub and the Algarve Smart Destination with the mission of foster the digital transformation of the industry and services, via the gathering of a critical mass of capacities, the networking of stakeholders and the nurturing

of the ecosystem, towards the deployment of added value support services that enables, potentiates and furthers industry modernization. Existent DIHs have a diverse thematic focus (tourism, manufacturing, agrifood) and geographic activities are mostly at national level. Each DIH has specific services they provide, such as: organization of dissemination and matchmaking activities (workshops, seminars, open days), coaching and connection to funding sources, promotes services offered by its service providers group, such as research and development, feasibility studies, technology roadmaps, strategic consultancy, consultancy on technology development and deployment, training, among others services not specified. Service providers includes following type of organisations: research institutions, industrial technological centres, industrial associations, incubators and science and technological parks, and technology companies.

The inspiration for the policy instrument improvement resulted from the Local Stakeholders Group meetings and the visit to the SmartFactoryOWL. During the meeting with stakeholders that were held in Centro, interrelated problems regarding the readiness of companies in the Region for digitalisation have been identified: there is a lack of awareness in top management and also a misunderstanding of what are the challenges of adopting technology that some times is still not mature; on the other side, there are some issues, such as lack of knowledge on security, that prevent companies of trusting in the technology connection and intelligent. Despite the existence of a number of funding instruments in the Portuguese context that can be used to support digitalisation, there is lack of coordination between public entities that must be facilitators to knowledge access and regulation improvement on funding sources. Sometimes the lack of information makes company highly dependent of their own time to find adequate partners to carry out transformation projects.

From the interregional experience, namely in the visit to the SmartFactoryOWL (Detmold, Germany) and following the discussion with business representatives, it became apparent that the centralization and mapping of support services is a key to build technological solutions resulting in innovation in industry. The Region has identified all players with competencies in fields such as industrial communication, industrial image exploitation and pattern recognition, intelligent analytical methods in automation, user experience and interaction design, intelligent automation, industrial internet, usability of technical systems, its security for industrial production. It includes also a test field for enterprises and special programmes that can empower SMEs for effective processes along the entire value chain through digitalisation. They showed the relevance of help in finding expert advice or a required partner or technology, and provide relevant information about existing regulations, challenges, issues. In Detmold, a good practice that was highlighted is the Training Programme for Technology Mediators in order to promote innovations in companies. Although this good practice can be addressed in the action 1 related with education and qualification, we also believe that technology mediators can be hired as consultancy services because of high technical and management skills needed. Therefore, we believe that the learning acquired in Detmold gave excellent contribution to improve the policy instrument we are addressing.

This action will make use of the already existent platforms, networks and associations, to create an informal digital acceleration community providing services and technologies that companies from Centro Region may use to improve their competitiveness. This community will address issues of replicability of solutions existent in the Region, in close cooperation with regional actors. Therefore, we intend to introduce an improvement in the policy instrument implementation by identifying, mapping and leverage national funding connected with the policy instrument itself. In the scope of the policy instrument addressed, there is two typologies of investment companies can apply for: i) technological research and development supporting companies to strength its technological capacity and intensity, mainly through cooperation with research and innovation organisations in high knowledge intensive activities to develop new products and services; ii) qualification to reinforce organizational innovation promoting definition of companies' technological strategy in line with principles of Industry 4.0 through the adoption of technologies that can allow innovative changes in business models. The identification of projects foreseen, as well as the detailing of their possible development, will allow detecting existing bottlenecks regarding the policy instrument that might hamper their successful implementation. With this information in hands, stakeholders will be able to draw up some recommendations for the Managing Authority in order to improve the Regional Operational Programme and, more specifically, the design of the instruments for the next programming period. At this stage, it is difficult to predict the recommendations that will be issued and, thus, the real improvements that will be made. Nevertheless, CCDRC expressed its availability and willingness to follow all the tasks foreseen.

2. Actions

This action will create and animate an informal digital acceleration community. This community will embody a more specific task, namely:

Task 1– Map a recognizable support network that can provide services to companies (eg. transfer mediators/experts, support services for technology adoption, regulatory support).

Task 2 – Reinforce local dialogues in existent networks and associations. The purpose is to hold one discussion workshop to debate difficulties, problems, challenges and opportunities building a trust environment and bringing industry and academia closer.

Task 3 – Organise one group discussion to define initiatives involving academia in companies' activities. These initiatives must involve graduated students, researchers and other technical/non-technical staff so that academic people could grasp the actual challenges and difficulties of companies (eg. Technological issues, business model redefinition) that can be mapped in the policy instrument priorities.

Task 4 – In collaboration with the managing authority (CCDRC), discussion of the outputs from previous tasks contributing to issue final recommendations for policy instrument management and evaluation of its outcomes. The final output will result in a document with recommendations and initiatives. This document will allow the managing authority to detect some existing bottlenecks and difficulties felt by the digital community in the region.

3. Players involved

The players that must be involved in the action implementation are the following:

- Local industry associations representing industry
- PRODUTECH Digital Innovation Hub Platform embodies a one-stop gateway for the provision of support services
- HEI will be involved in grasping actual challenges and difficulties of companies.
- CCDRC, as regional managing authority, will analyse recommendations for policy instrument evaluation.
- IAPMEI, the Innovation and Competitiveness Agency for SMEs, as manager of funding instrument Innovation Voucher Industry 4.0

4. Timeframe

| | |
|---|-------------------------------|
| Task 1- Mapping | December 2020 - March 2021 |
| Task 2- Reinforce local dialogue | February 2021- September 2021 |
| Task 3- Initiatives definition | February 2021- September 2021 |
| Task 4- Final recommendations | September 2021- December 2021 |

5. Costs

Internal costs of human resources. The measure will not represent a direct cost or expense to the administration involved.

6. Funding sources

No additional funding sources needed. Internal budget for meetings will be used.

Date: _____

Signature: _____

Stamp of the organisation (if available): _____