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Regions in Europe Coordinate and Optimize innovation and competitiveness policy instruments towards improving the sustainability of transport - study case of SMEs in the railway sector

Action Plan. Aragón (ES).

Content

1. Introduction.

Starting point, composition of the business fabric in Aragon, challenges to address

The business fabric in Aragon is characterized by the high proportion of SMEs, and very especially of micro-businesses, representing 95% of the total. The proportion of small and medium-sized enterprises in the region is, with 4.6% of enterprises, much lower than the ratios in the EU. This importance of SMEs in Aragon is also reflected in their outstanding contribution to employment, providing almost three quarters of the wage labor in the region.

The sectorial distribution of the activity is characterized by a clear orientation towards service and commercial activities. The industrial sector represents the lowest percentage of the total number of companies, with 7.8%. Nearly 60% of the companies in this sector are concentrated in four branches of activity: the food industry, furniture and wood, metallurgy and those related to the environment and energy (mainly energy supply and water distribution and treatment).

However, the Aragonese Competitiveness and Growth Strategy identifies a set of "strategic sectors" which constitute the basis on which to deploy the policies in the field of **competitiveness, internationalization, financing, social dialogue and institutional coordination**. Such sectors are **agri-food, energy, automotive, logistics (connectivity), tourism and new technologies** that are also the prioritized sectors in the Aragonese Strategy of Research and innovation for a Smart Specialization (RIS3), which we will refer to in more detail in section 2.

Finally, the results collected in the document of the socioeconomic and territorial diagnosis of Aragon on the factors of business competitiveness highlight the growing importance given to the processes of continuous training, which has led to the number of workers trained by their companies multiplying by more than six in only eight years. However, microenterprises show a clear weakness in this area, since the coverage (in terms of the percentage of companies providing training to their workers), despite its positive evolution since 2005,

reaches only 22.1% in 2012, having widened the gap with small and medium-sized enterprises (63.7%). This low rate of training involves a barrier for the innovation processes.

Likewise, improving the competitiveness of Aragonese companies in the current context of a global economy is also necessarily linked to **innovation,** both in **products and services** offered, as in the production **processes** involved. Aragon is the fourth Spanish region with the highest percentage of companies with technological innovations in the period 2010-2012, with 16.8% of companies. However, in recent years the Business investment in innovation has fallen sharply by more than 35%, much more pronounced than the one experienced nationally.

The degree of business internationalization has increased progressively, but in a very irregular way. This slow progress in penetrating international markets highlights the difficulties that even companies with a greater orientation towards foreign markets are experiencing, to place their products in other countries. Proof of this is that the total value of exports has remained almost constant, in recent years. [1]

Contribution of RECORD project.

In connection with what mentioned before, the RECORD project focuses on helping SMEs, in improving their capacities for developing innovative solutions that can compete and can be placed in local and foreign markets, within the framework or with the financial support of national and regional policy instruments. In these sense, most relevant policy instruments regarding the proposed RECORD´s action plan for Aragón, are presented in following sections of these document, specially the one that is going to be directly involved as a source of finance (Operative Program FEDER ARAGÓN 2014-2020).

The work carried out by the members of the consortium during the first phase of the project has been essential in order to arrive at the writing of the proposals contained in this Action Plan. The study visits have allowed knowing good practices in the support to SMEs deployed by all the participating regions. In addition, the contributions of the members of the regional

[1] Data collected from Operative Program FEDER ARAGÓN 2014-2020 (CCI 2014ES16RFP004).

stakeholders´ group have been a guide to translate gathered ideas into concrete proposals adapted to the reality and needs of Aragón and the structure and capacity of all the actors participating in the innovation local ecosystem.

2. R&I REGIONAL POLICIES AND INSTRUMENTS CONNECTED WITH THE ACTION PLAN

Operative Program FEDER ARAGÓN 2014-2020 (CCI 2014ES16RFP004)

Aragón has an operational program for granting ERDF aids under the objective of investment in growth and employment for the region of Aragón for the period from 1 January 2014 to 31 December 2020 and which contains eligible actions until 31 December 2023.

As stated in the introductory part of this document[2], the aim of the program is to define a strategy to address the main weaknesses affecting the economic and social progress of the Aragon region, which is consistent with the EU's political intervention framework and enjoys a high degree of consensus in order to involve the various social players and institutions in its development

Within this strategy, that counts with six **Priority Axis**, the first one focuses its scope of intervention on the promotion of R&D&I in the region, addressed the weaknesses associated with the reduced investment effort in R&D with respect to GDP, the absence of a Regional Innovation Agency, the loss of and innovative companies, the absence of sectors with high demand for R&D and the poor transfer of research results to the productive sector.

Among the expected results, in the business field are: the consolidation of a culture of innovation among the productive system of Aragon fostered by cooperation between different agents in the system, the promotion of technology transfer and the increase in the relevance of technology-based companies regions or countries.

The actions included in present Action Plan are connected with this Priority Axis 1, and clearly contribute to enhance the public-private cooperation to boost innovation and technology transfer.

[2] https://www.aragon.es/documents/20127/6488357/PO+FEDER+ARAGON+REPROGRAMADO+enero+2020+-con+car%C3%A1tula%2C+Decisi%C3%B3n+y+Anexo.pdf/76e4fe23-4f0c-faa3-164c-d8c6ca7b1f3a?t=1582789616578

Research and Innovation Strategy for Smart Specialization of Aragón (RIS3)

The Research and Innovation Strategy for a Smart Specialization (RIS3 Aragón) aims to consolidate a system of sustainable growth in the medium and long term in Aragón, both socially and economically, by strengthening actors in the system, increasing the capacity for cooperation among them, increasing business participation in R&D&I activities and favouring capacities of the regional society and economy.[3]

In this way, and with the ultimate aim of improving social welfare in the region, RIS3 addresses measures to boost Aragon's economic growth, focusing economic development efforts and investment on the region's strengths, to take advantage of its economic opportunities and emerging trends. To this end, RIS3 Aragón focuses the support of policy and investment in Aragón on a number of key regional priorities, as well as challenges and needs to enable knowledge-based development. Accordingly, the Strategy defines three strategic priorities in relation to **Connectivity,** Resource Efficiency and Welfare and Quality of Life.

The Connectivity priority includes activities related to the sectors of **logistics and transport material, manufacture of motor vehicles, bodywork, trailers and semi-trailers, railways and as well as companies supplying components for these**, two priority economic sectors for the regional development of Aragon whose niches of intelligent specialization are:

- **Integration and evolution of the supply chains**, especially the **development of products and logistics management systems** focused on improving the use of resources in the supply chains, which can result in a reduction of costs for companies and CO2 emissions.
- **Promotion of intermodality**, increasing the visibility of information in the logistics chain and synchromodality as well as new concepts in the **modal exchange of goods and the development of logistics nodes and corridors.**
- **Improvement of industrial processes** in the transport material sector, defining new lines of development improvement with a **high level of innovation**, both in the

[3] https://www.aragon.es/-/ris3-aragon.-estrategia-de-investigacion-e-innovacion-para-una-especializacion-inteligente

process itself and in the final products to be manufactured. Development of more efficient vehicles, carrying out projects focused on the development of technology and products for specific vehicles and equipment for refuelling hydrogen and other fuels, as well as the industrialisation of manufacturing processes and their improvements.

All the actions proposed in the Action Plan (see section 4 of this document), are strongly connected with this priority.

3. Methodology of the action plan

The present action plan has been developed on the basis of acquired knowledge in the exchange of experiences, identified needs in stakeholders´ group, as well as contributions from other cooperating agents of the regional innovation environment, especially the Department of Economy of Regional Government, in charge of the deployment of the strategic actions for the development of the Logistics in Aragón and that is providing advice to ITAINNOVA for the proper implementation of RECORD project.

The main contributions to the Action Plan come from the following activities carried out throughout the implementation of the RECORD project up to the present time:

International study visits

Since the beginning of the project five international study visits have taken place in Aragón (Spain), Haut-de-France (France), Tuscany (Italy), Västmanland, (Sweden) and Slovakia. All delegations´ participants in these experiences; representatives of the consortium members as well as invited guests representing SMEs, were able to know the details of good practices for the supporting and fostering of innovation in the railway industry through a large variety of instruments implemented at local, regional and national level, many of them financed with EU regional funds.. The most outstanding good practices known during the study visits have been collected in the **Policy Learning Platform** [4] and in the **Book of good practices** of the project.

Not only good practices, but also common challenges to address by SMEs of the railway sector to increase their innovation capacities were identified in the discussions held on the visits. The knowledge of the participant experts was put on the table to try to find common solutions to cope with them. It was even considered that the members of the consortium could keep on cooperating through their participation in other programs such as Innosup (H2020) in order to be able to advance on the path of jointly implementing the identified solutions.

[4] https://www.interregeurope.eu/policylearning/good-practices/

Group of stakeholders. Meetings held and remarkable results.

In November 2018 the Aragonese project's stakeholder group met for the first time. The group was made up of companies, University or associated centers, technology centers and different bodies belonging to the regional government.

This meeting, conducted as a focus group, resulted in a SWOT matrix (see Annex I) that served as a basis for further discussions with partners from other regions. Since then, different meetings have been held, either in-person or online (due to the COVID-19). In these meetings, common needs of companies that have participated have been identified. In many cases they are cross-sectoral needs motivated by the own nature and size of the companies: small, highly specialized, low R&D&I skills, low experienced in the use of innovation financial instruments, so on, and can be extrapolated to industrial small and medium enterprises of other sectors. These needs have been clarified and confirmed in subsequent meetings. The last one, a videoconference held on 3 July 2020, has been relevant input for the activities described in Action 2.

4. Action plan.

The proposed measures in RECORD´s Action Plan are described below, following the template supplied by Interreg Europe Program. The actions are planned to be deployed and monitored during the second phase of project.

Part I – General information

Project: RECORD

Partner organization(s) concerned: Instituto Tecnológico de Aragón (ITAINNOVA)

Country: SPAIN

NUTS2 region: ARAGON

Contact person: Cristina de la Hera Pascual / Isabel Villarig

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Phone number: 0034976010060

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.

Name of the policy instrument(s) addressed: **Operative Program FEDER ARAGÓN 2014-2020 (CCI 2014ES16RFP004)**. Henceforth, we will refer to this Program as OP.

Within the OP, the actions proposed and managed by ITAINNOVA, will contribute to the implementation of following Priority Axis and Specific Objectives:

1. **ERDF; ITAINNOVA Scientific and technological strengthening.**

- Priority axis: 1 .Enhancing research, technological development and innovation
- Thematic Objective: 1. Enhancing research, technological development and innovation.
- Priority Investment: 1A Improving research and innovation (R & I) infrastructures and the capacity to develop R & I excellence and the promotion of centres of competence, in particular those of European interest.
- Specific Objective. 1.1.2. Strengthening R&D institutions and building, consolidating and improving scientific and technological infrastructures.
- Action: ITA02 - ITAINNOVA Scientific and technological strengthening.

2. ERDF; Support R&D entrepreneurial leadership.

- Priority axis: 1. Enhancing research, technological development and innovation
- Thematic Objective: 1. Enhancing research, technological development and innovation
- Priority Investment: 1B. Promotion of investment made by companies in innovation and research, development of links and synergies between companies, research and development centres and the higher education sector ...
- Specific Objective. 1.2.1. Encouraging and promoting R&D activities led by companies and supporting the creation and consolidation of innovative companies. …
- Action: Impulse and promotion of R+D+i in Business Fabric.

Part III – Details of the actions envisaged

ACTION 1:

Name of the action: Advanced IA tools for planning and operation of railway logistics

1. Relevance to the project

The action has been inspired by an experience known during the last study visit of the RECORD project: the experience with the railway material manufacturing company TATRAVAGONKA, in the region of Region of Upper Nitra in Slovakia (see "Annex II: Railway industry as new opportunity for the coal mining region", for more details on this experience)

In that case, just as in the project under discussion, the regional government tried to identify chances for a sustainable economic development of the region based on:

- Making the local economy grow, not only based on the production of resources or raw materials, but also on promoting a modern and efficient industry for the transformation of these materials, trying, at the same time, to make this industry grow and be more competitive in the European context. In the case of Slovakian experience the main objective was to move from a local economy based on the coal mining industry to a modernized manufacturing industry. In the case of Aragon, the regional government is also trying to promote two key sectors for the regional economy: **agro-industry and logistics**, focusing on the railway to promote intermodality and to make transport more sustainable.

- Taking advantage of the opportunities of the present socio-economic context of each region, including opportunities arising from their geographical location. In the case of Tatravagonka, some conditions of the European context became opportunities to develop the railway industry in this area: the age of the railway fleet in the Eastern European countries, national granting programs, and strategic location for logistics (proximity to Poland, Ukraine, Hungary and Romania). In the case of Aragón, we also try to take advantage of the strategic location for logistics within Spain and in southern Europe. The project is also supported on (and exploit synergies), with previous investments, and existing knowledge and infrastructures in Aragón (three logistics platforms managed by the regional government, a multimodal terminal, so on).

Therefore, since the Government of Aragon is designing a strategic project for the regional economy, this action aims to contribute to it by complementing and improving it through the development of new services based on ICT (Artificial Intelligence), to allow the end user companies to receive a better service **(improved transport operations)**, as well as to make a more efficient use of both public and private resources involved in the project **(improved planning and deployment process)**. Additionally, this action allows bring companies and expertise from other sectors **(ICT sector)** into the original project, resulting on a more ambitious and challenging initiative to foster competitiveness and employment in SMEs in the region.

2. Nature of the action

Because of its geo-strategic location, the availability of space, the concentration of business, intermodality development and the ability to link corridors and routes, today Aragon is an internationally acknowledged logistics player.

The capabilities of the Region goes way beyond having the largest amount of logistics land available in Europe, on developed, large sites with competitive, advanced, flexible infrastructures (km 0 air connection, railway terminal next to the logistics sites, highway links with the principal roadways) and efficient services under continuous development. Aragon is

also leader in innovation and technology, standing out as a home for talent specialising in logistics owing to the capability and commitment of public and private institutions in the Community, to drive development of the sector.

Some of the entities represented in this commitment by the Community, headed up by the Aragon Regional Government are: The Logistics Platforms of Zaragoza, Huesca, Teruel, Fraga, Monzón, Zaragoza Maritime Terminal, Zaragoza and Teruel airports, Mercazaragoza, Aragón Exterior, Zaragoza Logistics Center Foundation, Aragón Technology Centers, the Logistics Innovation Cluster of Aragón, etc.

All these public and private companies comprise connection points and synergies between the different projects and activities carried out by each of them, making interest in Aragón grow exponentially.

All of them have a common nexus: they are top level developed projects which, along with the advantages our Community offers in terms of competitiveness, labour costs, communications, development, geo-strategic location, etc., create real interest outside our borders.

These joint strengths make Aragón a European centre of reference in logistics excellence.

Within this context, the Government of Aragón, by means of Aragón Logistics Platform (APL), is promoting projects to grow in the logistics sector, giving a decisive boost to intermodality, by committing to a high-capacity way of transport environmentally sustainable with our environment. This drive will be developed by establishing synergies with other key sectors of the region, such as the agri-food industry in this case. The logistics and the agri-food sectors represent 5,8% and 8 % of the region's GDP respectively.

With all this background and under the premise of developing a new value-added product that the agri-food industry market is already demanding, APL is designing a project to implement a new rail terminal, whose objective is to consolidate a hub for the reception, dispatch, and storage of raw materials for animal and human consumption.

All these operations require the handling of large volumes of data and information to support decision making with a double objective:

- Planning adequately the deployment of the terminal.
- To ensure that the logistic operations that are developed do it in an optimal way.

For this reason, the action proposed to be developed under the umbrella of ERDF, aims to **collect, process and extract value from the data**, through the development of **artificial intelligence tools** that allow the best decisions to be taken and, consequently, result in a **better service for the industries** that operate in the hub, as well as **greater efficiency of the initiative (costs, times, so on)** for all the stakeholders.

In detail, the actions to be carried out:

- Identify "key questions" to be answered by the data, and if necessary, search and include data from new data sources.
- Preparation of data (verification, filtering, cleaning, etc) and creation of data model/s.
- Development of descriptive analysis of current situation, operations, etc.
- Development of prospective analysis, to predict future situation.
- Development of visualization tools, according the needs of different stakeholders.

These actions should be implemented in successive iterations, as the "key questions" can vary in each stage of the Hub project and the sources and kind of data can be enlarged consequently. Also the participation and needs of stakeholders may be different in each stage (more public involvement in initial phases, more collaborative work in later phases, etc). This is the reason why the project is split in several phases to bring the flexibility enough to adapt to the Hub project stage needs.

The expected result at the end of the first phase is a platform based on artificial intelligence technologies (data analytics and business intelligence mainly) that which integrates data sources in order to facilitate knowledge-based decision-making to improve the planning and operation of the Hub. This platform will have three components:

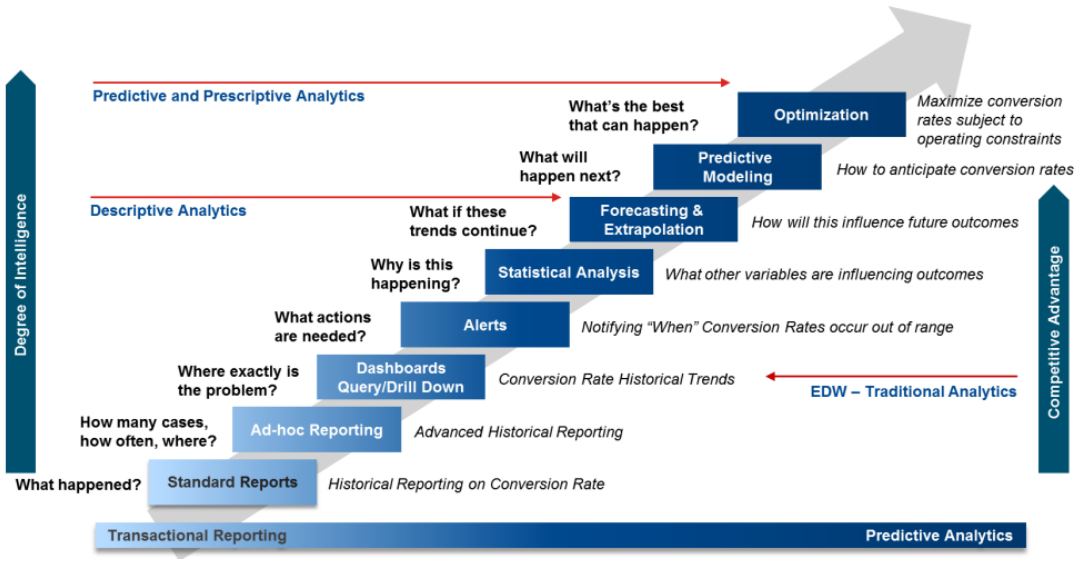
- **Data**, provided from different sources and which will be stored and managed from a more or less structured basis (database, data lake,)

- **Algorithmic**: algorithms that make it possible to obtain models of behavior to guide decisions, by using the data available.
- **Visualization**: Tools for the visualization of the information by the different stakeholders.

In the second phase, the plan is to continue working in these three areas: to extend the sources of data, to improve the quality of the data and the algorithms that treat it, and to extend the general functionality of the platform, taking into account the requirements of new stakeholders and the possibility of integration with other management systems (ERPs, etc).

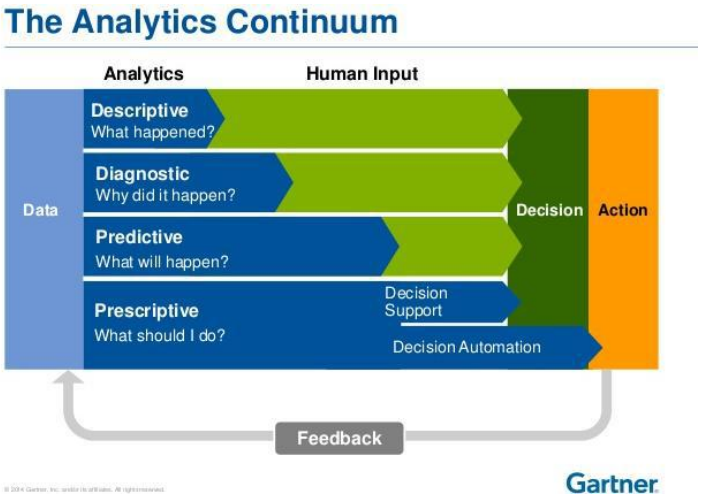
The development of a specific technological tool for the planning and management of the Hub, aimed at satisfying the current lack of predictive and prescriptive analysis, is a totally differentiating and innovative product, as explained below.

Both at a national and international level, the projects that deal with the improvement of operational process planning using ICT technologies are focused on the application of Data Analytics and the use of Business Intelligence in a diagnostic phase. At present, all the applications developed and aimed at Business Intelligence are based on the capabilities of the company's ERP and use already consolidated data to determine what has happened. Finding out the reason why it happened depends on human capacities for analysis.



Based on the figure above, it could be said that, in the best of cases, the tools currently available are at the top level of descriptive analysis where statistical analyses are introduced in order to detect what is happening and what other variables can influence the results.

The development of solutions that integrate Data Analytics and Business Intelligence technologies by applying predictive and prescriptive analysis models will allow the implementation of the continuous analysis cycle proposed by Gartner. This cycle proposes the generation of knowledge and valuable information (forecast, scenarios, simulation) and analysis for integrated planning in companies and decision making with minimised risks. While in predictive models the human factor in decision-making still has specific weight, in prescriptive models it can lead to the planning of production processes automatically.



3. Stakeholders involved

- **Aragón Plataforma Logística:** public company belonging to Regional Government represents a global logistics offer (infrastructures, training, research and services) which is available to any company or institution interested in making their business more competitive. It is one of the future owners, the manager and coordinator of the railway hub initiative, and in consequence is the main user of the developed tools, during the first stages of the project.

- **Department of Economy of Regional Government:** It is the regional Department which APL belongs to, so, by extension, it is also an end user of the results of the action.
- **Agro-food industries:** who, as well as APL, will be the final users of the intermodal terminal. The agro-food producers will decide if they want to participate in this project as shareholders or just as users (clients).
- **Railway hub stakeholders**: It will be necessary the participation and the know-how of companies which belong to the fright railway sector, such as rail companies who rent buck wagons, locomotives, so on.
- **Logistics companies:** which belong to the food sector.
- **Instituto Tecnológico de Aragón (ITAINNOVA):** as technological partner for this action, in charge of the definition of IA strategy and main developer of IA solution.

4. Timeframe

The action included in this plan is subsidiary to the main project (Hub), so its implementation will depend on the launch and progress of it. This action is intended to start in November 2020 and to be executed in at least two phases lasting until December 2021.

5. Costs

The action would be deployed at least in two phases:

- Phase 1, 14 weeks 2020-beginning of 2021: overlapping with the Hub's planning. The estimated budget of the action is 25.000 € (personnel costs).
- Phase 2, 2021: overlapping with the start of operations at the Hub. The budget estimation is not completely closed as it is influenced by the needs and opportunities identified in phase 1, and also by the progress of global project and the schedules of starting operation in the Hub.

In best case, we estimate 60.000 € (personnel costs) and 10.000 € (equipment costs).

It is the desire of the entity that manages this action as well as the promoter of the global project to extend this process in subsequent years by creating phases that are

executed consecutively and whose specific content can be defined on an annual basis, also linking it to public budgets. Although the action may last longer, there is no certainty that structural funds will be available after December 2021.

6. Funding sources

It is intended to co-finance the action by the already existing ERDF line mentioned in Part II, whose execution is approved by the Government of Aragón until December 2021. The intensity of the cofounding could reach 100% but will depend on the amount of funds remaining under this heading in the present Operative Program, (noticing that we are talking about last year of implementation of the OP). The part not financed by ERDF will have to be borne by the parties concerned (ITA, APL), that will also try to find another public funding instruments to cope with it.

From 2022 onwards, a new Operational Program is expected to provide continuity in the financing of this action, although this cannot be guaranteed with absolute certainty today. As in the previous case, ITA, APL would try to find additional funds (European, regional), to give continuity to the action.

ACTION 2

Name of the action: Working Group for the fostering of innovation in Mobility (focused on SMEs).

1. **Relevance to the project**

The action is a consequence of the RECORD project, although it is not related to the international exchange of experiences. As a consequence of the creation of the RECORD project's stakeholders group and the meetings held, the absence of a meeting forum of this type (networking group) and the need to give continuity to it has been noted. The continuity of this working group is foreseen at least during the second phase of the project to try to give a response to present and future requests, suggestions and needs from the small companies that have participated in the stakeholders´ group, and the ones that can join hereafter.

It has become evident in different meetings that, despite the existence of cluster-type

regional associations in the region, they have a sectoral scope and that there is a need for a framework (umbrella) from which to propose, promote and generate transversal projects in terms of both objectives **(sustainable mobility)** and means **(digitalization).**

Finally, another issue that has been highlighted in the meetings held in the first phase is that, despite the existence of innovation support structures, in general terms the level of cooperation between SMEs and between them and the different agents in the innovation system is very low, either because the existing instruments or structures do not generally meet the requirements of SMEs, or because the processes are complex (access to information, bureaucracy, so on). Another element that makes difficult this cooperation is the fragmentation mentioned in previous sections, and the lack of presence of large companies that could launch, lead and orchestrate coordinated initiatives and /or help to create cooperation networks.

For this reason, an action is proposed aimed at facilitating the networking necessary to facilitate cooperation and access to innovation-enabling instruments and tools at regional, national and European level.

2. Nature of the action

Taking advantage of both ITAINNOVA's technical capacities, as well as its connection with other forums (participation of Aragón's leadership in the **S3 thematic area of Safe and Sustainable Mobility**[5], participation in the Logistics and Automotive regional clusters, participation in the European platform for logistics ALICE, etc...) as well as previous experiences in boosting R&D&I in other sectors, and finally, the most important, the availability of a ERDF operation mentioned before, following action is proposed:

The creation of a **working group, open,** composed mainly of SMEs but also of the main actors who have participated in the group of stakeholders (R&D&I agents linked to transport/railway), which at least holds meetings on a quarterly basis, to try to identify common challenges and launch coordinated actions aimed at increasing research and

[5] https://s3platform.jrc.ec.europa.eu/mobility

innovation from SMEs. The activities that arise from this group will be executed as far as possible, under this ERDF operation but any type of financial mechanism may be considered to finance the projects: private contracts, competition for regional/national/European public grants, etc.

Concerning the success of this working group, some other different European initiatives related to the railway sector will be taking into account. For example the national Railgroup [6] or the European Railway Cluster Initiative (ERCI) which is leading the meta-cluster of the railway industry in Europe uniting 14 innovation clusters from 16 European countries and connect the ideas and interests of over 2,000 small and medium-sized businesses in the industry; or the Shif2Rail initiative which intends to boost the rail supply industry's competitive edge, introducing new market perspectives and offering significant employment and export opportunities.

Some of the common challenges to address have already been identified in the meetings held in phase 1 of RECORD project, and are listed below. This actions intends to go deeper on them and carry out related activities if appropriate in the coming months:

- Activities related to promoting and facilitating the protection of the intellectual and industrial property rights of SMEs, as a mechanism to protect and make their R&D efforts economically profitable. In particular, it is intended to give the group of SMEs information through dissemination tools or informative sessions (e.g. https://www.itainnova.es/blog/eventos/secretos-empresariales-el-valor-de-proteger-el-conocimiento/) and to facilitate the access to public support instruments like the call that Spanish patent and trademark office opens every year (e.g. https://www.infoactis.es/?ID=312&CODE=EEN1900046), as ITAINNOVA is continuously monitoring this type of opportunities.
- Actions aimed at improving the digitalization of the SMEs to increase their competitiveness. ITAINNOVA will provide SMEs with tools that it is already applying for this purpose, such as "digitalization diagnosis", or personalized sessions, e.g. design thinking sessions for strategic reflection and elaboration of "Technological

[6] https://www.railgrup.net/

routes for digitalization".

- Networking activities to foster the interrelation between the different R&D agents (academia, companies, technology centers), as well as the relations between companies for this purpose. The aim is not only to strengthen the cohesion of the actors within the group but also **to connect them, through ITAINNOVA** and its position within the Government of Aragon, with **networks, platforms, alliances, initiatives, etc,** at regional, national and European level in the field of mobility and transport. As examples of these networks:
    - Mobility City[7]: ITAINNOVA has been the first body belonging the regional Government to join this regional initiative promoted by Ibercaja Foundation and supported by the Government of Aragon, which aims to place Aragon at the forefront of the debate on the new mobility and the transformation of the associated industries and sectors, in which institutions and companies that are leaders in our economy collaborate
    - Aragon is one of the three leading regions of the "Safe and Sustainable Mobility" thematic area of the S3 platform[8]. ITAINNOVA is the technical coordinator of the region's participation in this platform.
    - European projects. Recently (July 2020) the H2020 European projects ENTRANCE and Reciprocity have been approved. These are just two examples of European projects in which ITAINNOVA is working in the field of logistics and transport, and in both cases the aim is to create networks. ENTRANCE aims to create a marketplace of solutions for logistics and transport that connects demand and supply and ENTRANCE aims to create a network of European cities (60 cities participating in this CSA), to facilitate the scalability and replication of innovative mobility and transport solutions.
    - ITAINNOVA is member of platforms like ALICE[9], Shift2rail[10], etc.

[7] https://www.mobilitycity.es/
[8] https://s3platform.jrc.ec.europa.eu/mobility
[9] https://www.etp-logistics.eu/
[10] https://www.google.com/search?q=shift2rail&rlz=1C1GCEA_enES832ES832&oq=shift&aqs=chrome.1.69i57j0l5j46j0.5093j1j4&sourceid=chrome&ie=UTF-8

- Actions aimed at increasing the participation of the sector's SMEs in regional and national, and international R&D programs (Horizon Europe, etc.), by analyzing their capacities and strengths and aligning their interests. In particular, ITAINNOVA, in collaboration with other organizations participating in the working group, and at the same time managers of regional funds such as Zaragoza Logistic Center or the University of Zaragoza, will draw up a map of the region's capacities and priorities, with the aim of facilitating the matching of these with the opportunities available at the present time and those that may arise in future Interreg and Horizon Europe programs, mainly.

The group will be provided with the appropriated means for collaborative work, based on digital tools that will be implemented and managed by ITAINNOVA.

Finally, this action will serve as a pilot and, will give the stakeholders and to the regional government valuable information to determine whether it would be useful and feasible to create a working structure, with a different organizational and legal form (e.g. cluster, association, etc), in the same way as other examples known in the interregional exchange of experiences

3. **Stakeholders involved**

ITAINNOVA, SMEs (transport, mobility, railway, and suppliers of these sectors), Regional Government, R&D+i actors.

4. **Timeframe**

October 2020-December 2021

5. **Costs** (*please estimate the costs related to the implementation of action 2*)

12.000-15.000 euros per year.

6. **Funding sources**

In the same way as Action 1, these activities will be co financed by the already existing ERDF line mentioned in Part II, whose execution is approved by the Government of Aragón until December 2021. The maximum intensity of the ERDF funding could reach 100% but it will depend on the remaining funds, as we are talking about the last year of execution of Operative Program. ITA may provide direct financing for this action from its own funds (coming also from regional Government), to complete the part not financed by the Operative Program.

5. Annex I: SWOT Analysis.

	Helpful	Harmful
Internal / Organization	**STRENGTHS**	**WEAKNESSES**
	Deep knowledge and strong technological skills in SMEs. Strong variety of internal and external resources used for innovation (own staff, universities, technological center, consultants, internships, exchange of personnel, grantship holders (public national and international programmes), etc. Participation of companies in standarisation platforms. Companies transfer technlogy abroad. Management of IPRs with external support.	The results of innovation projects use to be very theoretical, SMEs demand a more applicable results (more close to the market). Much interest in Research ofganizations in publishing articles and in growing up scientific CVs than in achieving applicable results of proyect. Lack of management of IPRs, or managed by external subcontracted companies. Lack of specialized and dedicated personnel to manage innovation, in particular, to search opportunities to promote and finance innovation, also to find the final beneficiaries of this innovation activites. Sometimes this rol is played by many different people in companies (responsible for areas different to innovation like opperations, human resources, etc). Lack of strategic view of personnel in SMEs, due to the scarce time to reflect and make up new ideas. Too much burocracy (internal and external) to access innovation. In the contractual relations between large and small companies, small ones are oblied to transfer all the IPRs to large ones (non equitable relation). SMEs have difficulties to carry out at the same time, innovation activities and comercialization. High cost of transportation vs. cost of product transported (reduce competitiveness). SMEs have not enough information of which forums/agents/means can help them to innovate.
External / Environment	**OPPORTUNITIES**	**THREATS**
	Set a system to put in contact and make different innovation regional agents easier to cooperate. Reinforcement of intra and inter companies cooperation. Stimulate networking. Create public "forums" to think together about sector challenges. Incentives to scientific professional carriers (at University, Research Centers, etc) based on the capacity of transfering technology and knowledge to companies. Concentration of public innovation efforts on specific market sectors, regarding with regional priorities. Regional political pact on innovation matters. Simplify burocracy of public instruments, to foster and grant innovation projects. Redefining of academic training subjects (ej. at University) to include innovation matters, in all kind of degrees. Include the point of view of companies (specially small ones in standarization committees), with an unique voice. Gain presence in international comimttees. More agility to adapt legislation. Politicians governing institutions could cooperate with companies to comercializa products lobby action), and take advantage of their influence and relations. Help to cope with some prejudices when contracting with regional (even national) companies, because a wrong way of thinking that other foreing technologies and skills are better... Set an innovation strategy for the sector, setting priorities and in a participative way. In public procurement processes, include criteria related to the innovative nature of product offered or the capacity to innovate of the company when evaluating proposals. Find objectives ways to measure it. Creation of a global ecosystem to foster innovation (including all kind of facilities and the creation of new companies or start-ups). Organize and give clear and comprehensible information on public instruments to boost innovation. Look and learn from other regions.	In general the frame, (political initiatives, economic grants, etc) is far to market. SMEs have difficulties to find "partners" and collaborators to carry out innovation projects. Difficulties to collaborate with R+D agents (University, etc.). In other regions, seems to be easier. Little willingness to cooperate. Lack of public initiatives (forums, meetings, etc) to find jointly solutions to face sector challenges. Lack of usefulness of associations (clusters), to solve common problems, sometimes it is better to ask directly one expert (personal relations). SMEs lack of answer to R&I centers/institutions to cooperate and participate in Research and innovation proposals. Public resources are excesively broken into many market sectors trying to cover everything. Lack of long-term political agreements to carry out Research and Innovation strategies, not depending on political results and parties governing. Cultural barriers to innovate, specially in public sector. Public economic grants sometimes obey to "fashionable" technological subjects. Public grants do not fund "risky" projects, innovative solutions not directly addressed to solve a market problem or cover a market demand. Lack of university training in innovation matters and strategic sectors for the region. University degrees do not include innovation subjects, in consequence, companies and professionals must enroll in postgraduate specialization courses (time and money consuming). Needing of creating a culture for innovation, and consider it as an attitude. This should be adressed since first stages of training (school). People must have the right attitude not only knowlege to innovate. Obsolete legislation. Some innovative products can not be put into the market because they can not be "legally" approved. Lack of coordination of public grants and instruments regarding innovation, in comparison with other spanish regions where the system is more organized and clear.

6. Annex II: Railway industry as new opportunity for the coal mining region

This is a good practice identified in Study Visit in Slovakia. Information provided by TUKE.

Title of the practice			
Railway industry as new opportunity for the coal mining region			
Keywords			
Freight, train bogies, railway, brownfield, coal mines			
Specific Objective/s			

• Develop a new and sustainable economic activity in the region, moving from a local economy based to coal mining industry
  ○ Use the manufactory infrastructure for the new Innovative production of railway freight car bogies, including research and development
  ○ Re-educate people working in the coal mine and provide them with job opportunities within new industry
  ○ Support regional competitiveness and innovation potential by development of research and development for the new manufactory
• Support national competitiveness and innovation potential by research and development capacities in the railway industry in which demand for innovative solution is expected to raise in the future.			

Owner			
Tatravagónka a.s. Poprad and Hornonitrianske bane Prievidza, a.s.			
Location			
Prievidza, Region of Upper Nitra, Slovakia (SK)			
Start Date	2021	**End Date**	2023
Detailed information			
Region of Upper Nitra in Slovakia was for many years known for its dependence on the coal mining industry. Depletion of coal mines reserves, lack of profitability and competitiveness as well as environmental request of the EU lead to their closure not only in Slovakia, but within the whole union. For this reason, Action plan for the transformation of the coal region of Upper Nitra have been developed, with the financial support by European Commission (Structural Reform Support) defining the new opportunities for the regional economy. In 1981, when the mine "Cígel'" was closed and the company was searching for new opportunities, the idea of a foundation engineering company was created, based on the need to provide services for other mines in the region and provide new jobs for workers from the closed mine. The new company "Mining mechanization and electrification Nováky" was founded and today produce construction machinery and transport equipment for the whole European			

market.

The situation on the European coal market and the restrictions by EU lead to the decision that the region shall be transformed and focused on more prospective industries. And according to experience from the past, the idea to support engineering production was naturally discussed.

Approximately 200 km from Novák, a national company with strong engineering history is located– TATRAVAGÓNKA, which today belongs among the most significant manufacturers of freight railway wagons and bogies in Europe.

Strength of TATRAVAGÓNKA trademark is supported by almost 100-year history of determined and tireless work. TATRAVAGÓNKA manufactured more than 130 000 freight wagons (approximately 1 800 km) in almost 100 different design executions and approximately 400 000 bogies. With more than 2 500 employees it is a strong company with high innovative potential as 90 % of their production is the result of internal R&D.

According to the joint effort of two new partners, Upper Nitra mines Prievidza and TATRAVAGÓNKA, the new idea of Innovative production of railway freight car bogies, including research and development, was developed, while the proof of its quality is the official acceptance within the Action plan for the transformation of the coal region of Upper Nitra, identifying the strategic projects, which can significantly help to transform the regional economy according to the specific pros and cons of the region and the stakeholder situated there. This new joint company will help to increase diversification of the regional economy and support potential and competitiveness of the engineering industry which today creates 13% of the regional GDP.

Thanks to the support by European Commission via Structural Reform Support, they have been able to develop regional SWAT analysis and map all relevant stakeholders with their ideas and jointly create a new plan of regional transformation, which will be also supported by EU, especially by the programme The Just Transition Mechanism and also by European Regional Development Fund, European Social Fund, Cohesion Fund, European Agricultural Fund for Rural Development and European Maritime and Fisheries Fund.

Resources needed

Overall expected budget: 100 000 000 EUR

The investment is planned to be covered partially by EU Funds - The Just Transition Mechanism. But as the max. financing rate by EU Funds is 20-25%, which was assessed as not sufficient for this project, the government of the Slovak republic is actually discussing with EU Commission the possibility to raise the financing rate to the needed 50%.

Evidences of success (results achieved)

The planned project will create 800 new jobs, while 500 people will be working for the new joint company (200 people working in the coal mines will be re-educated and 300 new workers will be hired) and additional 300 new jobs will be provided by created supply

chains. The raise of competitiveness and innovation potential is expected, which will support regional economic development.
Potential for learning or transfer
Many European regions today face the challenge of the regional transformation due to the closure of coal mines. New opportunities are sought out and this case study can be valuable inspiration how should the process of economy transformation on the regional level be planned, including not only renovation and adaptation of buildings and mechanical infrastructure for new functions, but also new education of the inhabitants who will be changing their job due the structural industrial changes. Regional transformation is particularly important decision and is followed by the change of the strategic goals by local companies, which is naturally critical and sensitive topic for employers, as well as employees. In the process, the communication and cooperation with all stakeholders are crucial and the case study of Upper-Nitra region can be good example. Action plan for the transformation of the coal region of Upper Nitra which was developed in a cooperation with all quadruple helix stakeholders can be provided as good practise of the co-created development plan, by using opportunities provided by European Commission, within the Structural Reform Support. Thanks to the European funds it was significantly easier to perform long-term preparation process, enabling us to identify the needs and requirements of all stakeholders and reflect to the specific local aspects.
More information (website, etc)
www.tatravagonka.sk or www.hbp.sk

Date: September 25th, 2020

Name of the organisation(s) :

ITAINNOVA

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