



# RICAIP Exploitation Plan

**Deliverable 7.3**

Horizon 2020

Call: H2020-WIDESPREAD-2018-2020

Topic: WIDESPREAD-01-2018-2019

Type of action: CSA  
(Coordination and support action)

Number: 857306/Acronym: RICAIP

## Deliverable Report

**Date:** 30.09.2020

**Dissemination:** Public

**Status:** Final



Document Status	
Deliverable Lead	Andrey Girenko, DFKI
Internal Reviewer	Pavel Václavek, CEITEC BUT
Work Package	WP7- Dissemination, communication and networking
Due Date	2020-09-30
Delivery Date	2020-09-30

### Status

This deliverable is subject to final acceptance by the Executive Board.

This deliverable was approved by the Executive Board on 29.09.2020

**Further Information** [www.ricaip.eu](http://www.ricaip.eu)

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## 1 Purpose of the document

The Exploitation Plan presents an integral part of the *WP7 Dissemination, communication and networking* and is closely related to the deliverable D7.1 Dissemination strategy and standards. The main objectives of RICAIP exploitation plan are to:

- define and implement a set of tools and activities to exploit the project results;
- guarantee that the project results last even after the project ends;
- ensure the project results are uptaken into technical rules, guidelines and standards that facilitate different levels of exploitation;
- encourage the target groups (stakeholders) to provide inputs regarding the project outcomes and results;
- guarantee open access to RICAIP scientific publications and research data;
- define IPR protection and commercial issues related to RICAIP results (based on rules set up in the PCA and Grant Agreement).

This document presents RICAIP's general joint exploitation strategy describing several major activities. Furthermore, it describes main exploitation channels along with detailed description of RICAIP's key exploitable results (KERs). At the same time, the Plan defines its key actors and identifies opportunities and potential risks and barriers to successful exploitation activities.

RICAIP dissemination and exploitation activities are closely connected to the communication strategy (D7.2 Communication strategy and standards). These activities aim to promote and increase awareness about project activities, research results and other impacts of the RICAIP project and sharing these results with potential users.

Dissemination activities were identified within two main sections regarding the exploitation of the project results: (1) activities informing about general results of RICAIP – focused primarily on the general public (websites, videos, articles in magazines, social media, open days, guided visits, etc.), (2) activities making results of RICAIP available to use – focused primarily on academics/researchers/students/industry representatives (regular publications, participation in relevant conferences, membership and active contribution to the selected research networks and associations, participation in thematic fora, transfer ideas, concepts and result of latest Industry 4.0 research, networking activities, training/workshop/demonstrations etc.). Specific results may also be provided in the way of licenses and patents that will allow to transfer the knowledge obtained within the research in

RICAIP to real-life applications that contribute to increasing the wealth of the society. By supporting the industry, especially the small and medium-size enterprises, in adopting new and effective technologies and further improve their effectiveness by deploying advanced methods of AI, machine vision, digital twinning and others, RICAIP is supposed to contribute significantly to the competitiveness of the companies. Furthermore, it will help to the society by showing how such new achievements increase the quality of production, and consequently the quality of life.

This deliverable is considered a flexible, living document that shall help RICAIP and its partners develop a comprehensive approach to the exploitation activities. Therefore, the update to the exploitation main activities along with its KERs will be provided.

## 2 Introduction

The aim of the Research and Innovation Centre on Advanced Industrial Production (RICAIP) is to develop a strong cooperation at international level evolving the concept of Industry 4.0. RICAIP will virtually connect the testbed facilities in the Czech Republic (Prague, Brno) and Germany (Saarbrücken) and integrate them into a new Czech - German research infrastructure in advanced distributed industrial production.

The intention is to develop RICAIP as the European research infrastructure, the first of its kind in Europe. The RICAIP Centre will become an international hub for Industry 4.0, esp. for multi-site industrial production and multi-site production system development, and change the industrial research in a more interdisciplinary way, bringing excellence and new solutions to the sector.

The idea of a geographically distributed, but virtually integrated experimental testbed with an open access policy will help to integrate research activities in the subject field internationally and help to leverage the investments by a wider SME community. This will also be a strong driving force for standardization efforts. RICAIP sets the grounds for intensive cooperation between industry and academia.

Exploitation as a term specific term to the H2020 Programme means to make use of the results produced in an EU project in further activities (other than those covered by the project, e.g. in other research activities; in developing, creating and marketing a product, process or service; in standardisation activities).

The dissemination and consequential exploitation of results is a complex process applicable to research and innovation at every level of technological readiness, as well as to basic research, where it is necessary to focus on follow-up research and end-use in highly innovative products, services and processes.

Exploitation plan of RICAIP project is focused on identification of target groups, recognizing the exploitable RICAIP results and planning of their sharing with the stakeholders. This is a flexible, living document that shall help RICAIP and its partners develop a comprehensive approach to the particular tools and exploitation activities.

### 3 RICAIP Exploitation Plan

Effective exploitation plan for RICAIP project aims to reflect the key exploitable results which are clearly identified. It determines their direct and indirect value and impact for different stakeholders. In addition, the plan recognizes barriers and risks for exploitation, especially actual use of the results after project funding. Moreover, the exploitation plan describes the roles and responsibilities of partners in exploiting results or supporting results exploitation by other, intermediate or end, users.

RICAIP exploitation activities will be all in accordance with Article 28 “Exploitation of results” of signed Grant Agreement under no. 857306. As the result of this article RICAIP partners must take measures aiming to ensure ‘exploitation’ of its results (either directly or indirectly), in particular through transfer or licensing by:

- Using them in further research activities (outside the action);
- Developing, creating or marketing a product or process;
- Creating and providing a service, or
- Using them in standardisation activities.

In case of non-compliance the grant may be reduced or other measures can be undertaken.

#### 3.1 Joint Exploitation Strategy

The exploitation of the project’s results is the key element for the success of RICAIP. The overarching exploitation objective of RICAIP is to deliver innovative solutions to market by providing key knowledge and infrastructure. The general project exploitation strategy also encompasses the following activities:

- **Intellectual property protection:** RICAIP is committed to providing results in open access (publications in open access journals, publication of the results on the RICAIP

website, using open access archives). While the project's main results will be open source and publicly available, it will be made via a licensing type that is consistent with integration in commercial use. The consortium partners will take the necessary steps of protecting the IP generated as part of their individual exploitation efforts.

RICAIP consortium's IPR strategy will follow the rules adopted by the European Commission and the best practice of IPR protection published by the EC to protect the IP generated within the project, minimise potential risk and eliminate possible conflicts raised by IPR issues. The key principles of RICAIP IPR strategy follow the Consortium Agreement (Section 8: Results, Section 9: Access rights) and Grant Agreement (Article 23a: Management of intellectual property, Article 26: Ownership of results), with the main principles:

- Each partner remains the sole owner of its IPR over its background.
  - The foreground will be owned by the project partner who will generate it. If it is not possible to determine the exact share of generated IPR (more partners participated in the foreground), the parties will have the joint ownership of such foreground according to the pro rata effort invested by each partner.
  - Each partner will make available its foreground and background for exploitation purposes under fair and reasonable conditions
  - If a possibility of results exploitation arises (such as commercialisation, industrial cooperation), all the partners to whom the intellectual property belongs will be contacted to participate in the negotiations
  - The IPR strategy will follow the rules and guidelines of the EU and participating institutions.
- The RICAIP team will engage in **continuous analysis of technology transfer opportunities**, adjusting the project when necessary in order to ensure the best possible outcomes. The transfer of best practice between Czech/German partners enhances the mutually beneficial collaboration. The project aims to build up the unique RICAIP centre with an effective management structure, which will allow to react flexibly to new emerging technologies, to be resilient to temporary difficulties and to optimally utilise resources. The transfer of the EU's best practices and expertise in advanced industrial production will positively impact the Czech R&D sector. The transfer of knowledge from the German partners in the area of technology transfer by implementing the innovation cycle strategy will certainly increase the number of commercialised results. The project team will engage

in transfer activities of major findings into the development of products and services and their efficient dissemination and communication.

- The RICAIP team will **investigate economic and societal benefits** from the impact of research results and **set up a business development strategy**. The exploitation activities must ensure sustainability of project's results and monitor the impact (influence) on academia, industry and society. There will be continuous evaluation of the advancement of the research results against the user requirements/needs throughout the project with the help of the partners and we will apply adjustments of the project when necessary. The strategic role in the RICAIP business development will have the newly established RICAIP EEIG legal entity, that shall be invited to join the RICAIP consortium as the fifth member (preparation of the status and necessary documentation for establishment is planned for March 2023).
- All project partners will **focus on dissemination activities related to innovation performance**, esp. multi-site demonstrators / use cases demonstrations for interested industry stakeholders to help exploit the project's results. The *D7.1 Dissemination strategy and standards* specifies full range of dissemination activities (with clear and ambitious KPIs) for specific target groups to support efficient exploitation of project results.

### 3.2 Business Model Canvas

Innovation requires new technologies and products, but foremost new business models. In the European knowledge economy, production and services are based on knowledge-intensive activities. These activities contribute to an accelerated pace of technical and scientific advance. Business Model Innovation needs to start at the same moment when an entrepreneur has a new idea, a new technology, or sees a market opportunity. The elaboration of the Business Plan will be a key exploitation mechanism that will assist RICAIP in market uptake. RICAIP foresees the initial Business Model (see Figure below) to identify the commercialisation potential of project's results and the potential of the RICAIP partners to demonstrate the viability of the business prospects.



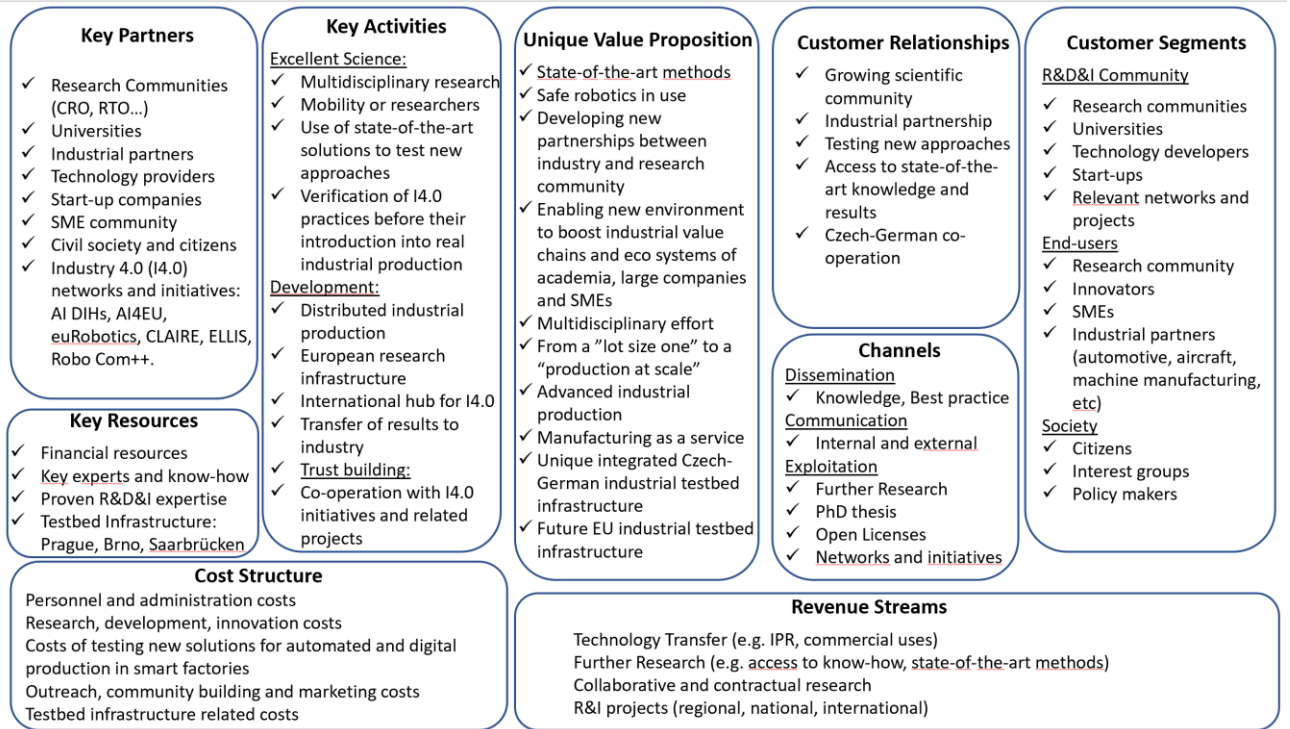


Figure 1. Business Model Canvas

### 3.3 Open source, open data, open access

European Commission's core strategy has been making research findings available free of charge. Moreover, it is widely recognized that making research results more accessible contributes to better and more efficient science, and to innovation in the public and private sectors. As such, all projects receiving Horizon 2020 funding are required to ensure that any peer-reviewed journal article published is openly accessible, and free of charge (Art. 29.2. Model Grant Agreement). Additionally, as a part of Horizon 2020, the RICAIP project also participates in a pilot action on the Open Research Data (ORD) aimed to improve and maximize access to and re-use of research data generated. RICAIP project will have clearly indicated what data will be open (related to scientific publications disseminated via "green" open access), the way of exploitation, access, re-use and preservation.

RICAIP project will use self-archiving/"green" open access to archive final peer-reviewed manuscripts in an online repository (such as Czech Technical University Digital Library, Brno University of Technology Digital Library, or OpenAIRE as a service indexing repositories, etc.) before publication. Open access to the publication will be provided within at most 6 months. Furthermore, details of all publications even partially funded shall be uploaded to bibliographic social networks such as [www.citeulike.org](http://www.citeulike.org), [www.mendeley.com](http://www.mendeley.com) or [www.bibsonomy.org](http://www.bibsonomy.org).

All open source software produced by the consortium shall be published on publicly available repositories such as sourceforge.net, github.com or osor.eu. All data sets for which this is appropriate shall be published on the project website [www.ricaip.eu](http://www.ricaip.eu) under an open license like Creative Commons.

More details on planned activities regarding the open access and following the best practice of the OpenAIRE (Open Access Infrastructure for Research in Europe) are present in the very first draft of the “live document” of RICAIP Data management plan that have been provided in RICAIP deliverable D2.8 (Data Management Plan) in February 2020. The Plan has been formulated in order to provide indications as to what kind of data the project will collect, current planned actions to how the data will be preserved and which sharing policies will be adopted towards making these data readily available. RICAIP project is also determined to publish all data sets for which this is appropriate on the project website [www.ricaip.eu](http://www.ricaip.eu) under an open license like Creative Commons. The consortium will aim to at wherever applicable using open source licensing which might provide for better visibility, outreach and re-use of the results. As such, it could be beneficial to the overall impact of the project and equally important use of results after the project ends.

#### 4 Exploitation activities at RICAIP

The goal of RICAIP exploitation is to ensure the sustainability of the project’s results beyond the project end and to demonstrate how RICAIP Centre has influenced the EU landscape. Exploitation includes multiple forms:

- **Research & development:** by engaging new projects (EU funded or from other sources), based on the experiences gained in the project and by mutual knowledge and best practice sharing
- **Financial exploitation**, building products, projects, or services based on the project results;
- **Educational activities**, building excellent science (tenure-track positions), workshops and trainings
- **Knowledge and technology transfer**, from academia to industry and vice versa, by collaborative and contractual research
- **Contributions to open-science**, by openly sharing results, data and knowledge
- **Community-building:** strengthening the ecosystem around the topics of the project, raising awareness for the addressed problems and the proposed solutions;

The main exploitation activities are depicted in Figure 2 and further elaborated within the deliverable.

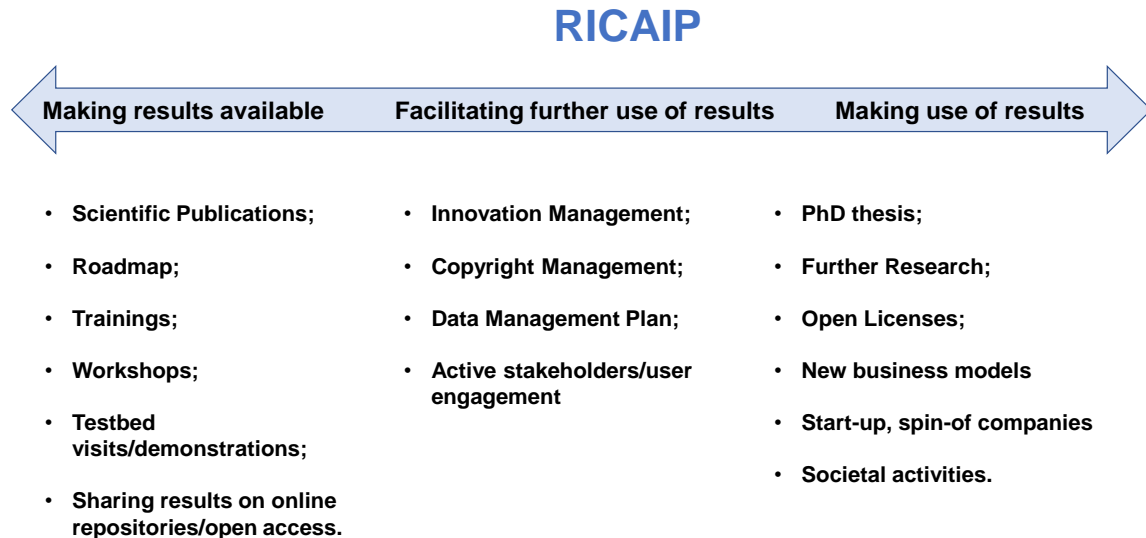


Figure 2: Exploitation activities at RICAIP

#### 4.1 Main exploitation channels

RICAIP project's main exploitation channels can be categorized into scientific publications, promotion and media, showroom, educational activities, multi-site demonstrators / use cases performed, public so called "RICAIP branded events", roadmap, further research, societal activities.

##### • Scientific publications

The scientific papers published or presented in highly rated scientific journals and conferences will result from future projects. Scientific publications, scientific papers presented in peer-reviewed journals and conferences and research data will be distinguished as:

- Direct project results: at the moment, the scientific results will be delivered in form of two use cases and demonstrators.
- Future results: raising from future projects implemented within RICAIP infrastructure and/or involvement of RICAIP in collaborative research projects. The publications of scientific outputs in an academic context is one of RICAIP's main targets.

More details have been presented in submitted *D7.1 Dissemination and strategy and standards* in May 2020. Publications will be present in both scientific and expert journals.

The indicative list of scientific journals is presented below:

IEEE Transactions on Pattern Analysis and Machine Intelligence; International Journal of Computer Vision; Automation in Construction; IEEE Transactions on Industrial Electronics; IEEE Transactions on Visualization and Computer Graphics; Journal of Manufacturing Processes; IEEE Transactions on Industry Applications; Production Planning and Control; Journal of Intelligent Manufacturing; CIRP Journal of Manufacturing Science and Technology; Journal of Building Performance Simulation; International Journal of Advanced Manufacturing Technology; and Building Simulation.

The non-exhaustive list of other relevant journals:

European Journal of Information Systems; IEEE Transactions on Engineering Management; IEEE Security & Privacy; ACM Trans. on Information & System Security; Journal on Computer Fraud & Security; ACM TOCHI; Human-Computer Interaction; Int. Journal of HCI; IFAC Control Engineering Practice; IEEE Transactions on Automation Science and Engineering; IEEE Transactions on Image Processing; IEEE Signal Processing Magazine; The International Journal of Robotics Research; IEEE Transactions on Computers; European Journal of Operational Research; IEEE Transactions on Industrial Informatics; Computers and Operations Research; IEEE Transactions on Systems, Man, and Cybernetics.

- **Promotion and media: website, e-Newsletter, social media**

Official RICAIP website ([www.ricaip.eu](http://www.ricaip.eu)) is one of the main communication and dissemination tools of the project. As such among other things it will allow for publication of the RICAIP results.

Newsletter will serve its primary purpose of maintaining regular contact with the interested community and shall contain up-to-date RICAIP-related information. An important part of the newsletter should be also information on past and future events which RICAIP will organize or be part of. In order to present tangible results, top publications will also be presented here.

RICAIP social media profiles will not only raise awareness of RICAIP but also share the project results. RICAIP [Twitter](#) and [LinkedIn](#) profiles already exist in this early stage of the project, whereas Facebook and Instagram profiles are planned to be created during the project.

- **Showroom**

The RICAIP centre will create an open environment (distributed testbed) where research and industrial stakeholders will have the opportunity to jointly experiment and innovate on new technologies and transfer them to the economy. At the same it will serve as the application environment for educational projects (e.g. PhD and MSc projects, innovation training, etc.).

The Industry 4.0 Showroom (I4.0 Showroom) will present an inseparable part of RICAIP. As such, the I4.0 Showroom will open the access to research outcomes and encourage formal and informal science education. It is a sophisticated and complex concept consisting of a physical place for visual and interactive presentation of RICAIP, its outputs and infrastructure.

The main purposes of the I4.0 Showroom will be not only I4.0 popularisation (to present the existing I4.0 demonstrators in real life to the different target groups), but also presentation of RICAIP project, its results, training, knowledge transfer etc.

- **Educational activities**

RICAIP centre's mission is to contribute to education and training of highly qualified professionals for research, industry, and public and investing in the human capital by providing world-class training to research personnel working in RICAIP. RICAIP trainings and workshops will introduce top RICAIP technologies and expertise available; offer opportunities for joint research collaboration and projects. Accordingly, RICAIP project aims to provide online training webinars, skills training services for workers of industrial partners; short term targeted training programmes for skills development; and qualification services for industrial companies.

In addition, RICAIP project is determined to contribute to industry driven student thesis; placement of industrial PhD positions and scholarships; joint PhD projects; and industrial PhD positions funded by companies.

- **Multi-site demonstrators / use cases performed**

RICAIP Industry days as one of RICAIP branded events will represent the open days for industrial partners and companies interested in I4.0 including EU Testbed Core findings on

Industry 4.0 impacts on society, especially impacts of digitization, robotics, and the Industry 4.0 on employment, qualification and skills requirements, eventually new categories of jobs.

RICAIP Industry Days are an opportunity for transfer of ideas, concepts and results related to Industry 4.0 advances. Possible ideas for the Industry Days will be:

- open doors and guided tours in RICAIP testbed facilities;
- introduction of the top RICAIP technologies and industry-relevant;
- open opportunities for joint research collaboration and projects;
- demonstrators and use case presentations;
- social-economic topics related to business and industry, incl. HR and workforce transformation;
- face-to-face meetings and interactive sessions designed according to companies' particular level of reached knowledge and digitalization.

In later stages of the project, the RICAIP Industry Days will serve as a showcase to exhibit the near-market solutions.

- **Public events**

RICAIP concept of so-called "RICAIP branded events" will include among others:

- RICAIP Scientific Conference;
- RICAIP Industry Days;
- RICAIP Open Day;
- RICAIP Industry 4.0 Information Days;
- RICAIP Brain & Breakfast sessions.

The organized events will increase awareness of given issues, propose solutions and also share project results, strengthen the relationships with research communities, universities, industrial partners, SMEs and civil societies. More information on "RICAIP branded events" can be found in *D7.1 Dissemination strategy and standards*.

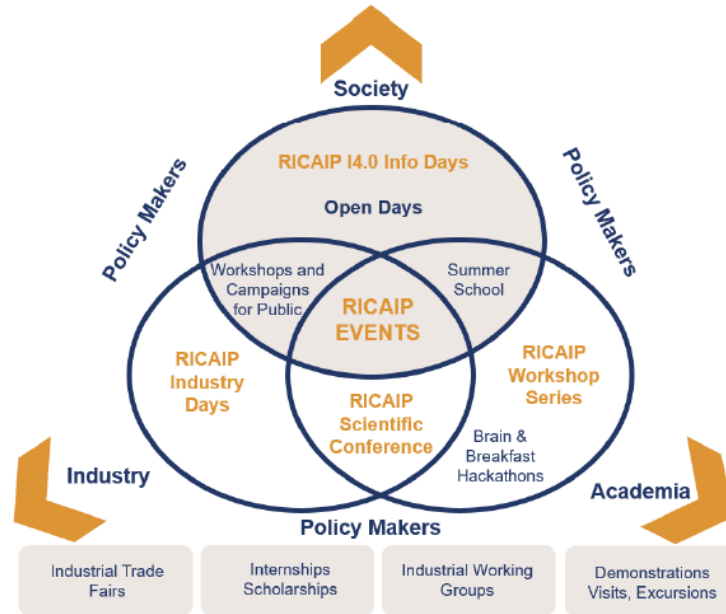


Figure 3: RICAIP branded events in context of other actions

- **Roadmap**

The RICAIP ambition to set the grounds for the future EU R&D Infrastructure is one of the key RICAIP differentiators. The inclusion of RICAIP in CZ and GER ESFRI Roadmaps is determined by the approval of governmental bodies in both countries. With this respect, RICAIP pays great attention to set its goals in line with national and European strategies regarding the ESFRI community. This is supported by the clear positive response from various stakeholders via Letters of Support.

Furthermore, RICAIP is in full alignment with the Czech national and regional strategies, and the national I4.0 Initiative. Moreover, CIIRC CTU and CEITEC BUT will jointly seek for entering the Roadmap of Large Infrastructures for Research, Experimental Development and Innovation of the Czech Republic in 2020, before the launch of the follow-up funding period 2023–2029. RICAIP facilities at CIIRC CTU and CEITEC BUT will represent the national testbed infrastructure as exceptional and unique R&D capacity and R&D integrated platform, having extensive knowledge of technological and financial matters and providing the research community with resources and services required to conduct comprehensive, cutting-edge research and technology development.

- **Further Research**

One of the RICAIP's main principles of cooperation with the industry is joint development of results of research for the benefit of public. RICAIP project aims to set up joint research and innovation labs including "living" labs. Also, undergraduate, graduate students and early stage researchers will strengthen the impact of RICAIP activities and contribute to new research agenda.

In addition, the RICAIP Grant Lab strategy has been established in order to serve as an instrument to secure additional competitive public and private funds for RICAIP sustainability and further development. The RICAIP Grant Lab strategy leverages synergies between RICAIP partners and focuses on enhancing the joint project strategy to increase competitiveness in gaining European funding. It aims to promote highly competitive H2020 and upcoming Horizon Europe projects (individual and cooperative) for the RICAIP consortium to raise awareness about the grant possibilities.

Equally important, the Czech Initiative I4.0 emphasizes the necessity to find a suitable form of support for creating start-up companies. These companies will play an important role, especially in the Czech Republic, where the driving economic force constitutes SMEs, many of which have been transformed from start-ups. By using RICAIP's virtually connected testbeds in the Czech Republic and Germany, young innovators and inventors will have a unique opportunity to transfer their ideas into highly applicable industry-driven products, promote research tasks via demonstrators on the state-of-the-art equipment or develop their own business via start-up or spin-off companies.

- **Societal Activities**

As the fourth industrial revolution binds companies and countries ever more tightly together, through worldwide flexible supply chains and data networks, it will increasingly promote globalisation. Therefore, the strategic interest of the Czech Republic is to follow the German best practice to improve the country's competitiveness and standing in the global economy - in this respect, RICAIP is one of the many elements of the national strategy aimed at turning the Czech Republic into an industrial leader in Europe and beyond. More specifically, RICAIP is one of the prominent implementation mechanisms of how to become a trustful partner within the European research infrastructure, how to expand existing key partnerships and to build new ones in a close interaction with the globalisation process of Industry 4.0.



RICAIP aims to address the challenges of industrial production and also to take advantage of the social implications of Industry 4.0. The fourth industrial revolution, as the driver of industrial and societal change, unlocks new opportunities for growth in qualification, flexibility, and creativity of people, thus opening the possibilities for several groups of population to participate in the workforce in a new way and with new quality. All human activities, both business and social life, have been significantly changed by the Internet. From this fact stems the necessity of adjusting the educational and vocational training programmes. Multidisciplinarity is one of the key aspects in the advance of Industry 4.0.

The recruitment strategy at RICAIP has to be targeted not only at the staff possessing technical/scientific knowledge, but it will consider other professionals as well. This is a clear window of opportunity for experts from non-technological domains. Moreover, special emphasis will be also put on “hybrid skills”, combining technical know-how from several areas with soft and interpersonal skills (management, languages, social intelligence, etc.). A new era of industrial workers cooperating in multi-skilled teams means new opportunities for candidates that were traditionally not involved in technical areas.

However, success is contingent on the critical level of human capacity in the educational and scientific sector, sharing and enhancing the vision of Industry 4.0 towards a smart and responsible Society 4.0. RICAIP aims to tackle many of the current societal challenges in the Czech Republic, such as low diversity in technically oriented research domains, insufficient multidisciplinary cooperation, low industrial involvement in joint collaboration, and/or low internationalisation and mobility.

## 4.2 Key exploitable results

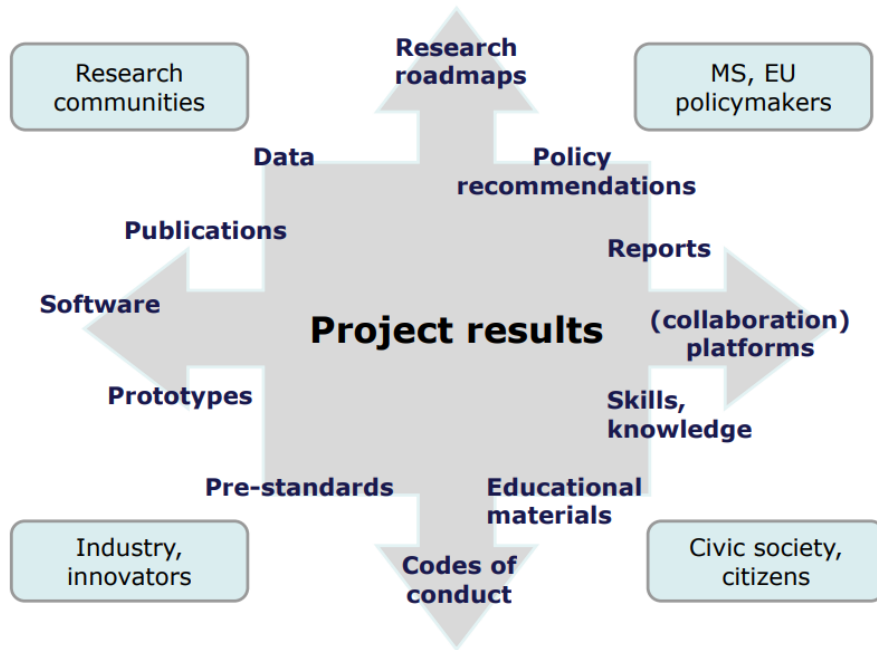


Figure 4: Exploitation of project results

There are several major types of exploitable results provisioned by RICAIP project:

- Technologies;
- Unique testbeds network;
- Knowledge and technology;
- Methods;
- Networks;
- Protected IPs;
- Open source research results;
- Services;
- PhD thesis, educational materials;
- New products;
- Further research and synergic projects;
- Spin-off companies;
- Societal activities.

Key Exploitable Result <sup>1</sup>	KER description	Exploitation Plan
Technologies	Technologies are typically provided as single-vendor solutions, which are usually bounded to a certain engineering and development tool provided by that manufacturer.	<p>The distributed nature of RICAIP relies on connecting the remote sites and their technologies into a complex system, where the shared data will form its hegemony. The exploitable results will be based on creating standard tools for data acquisition and analysis, ready to be deployed in real-life applications. Such tools will be integrated in so-called System Integration Tool, which will be based on semantic representation of system components and machines and negotiation of their capabilities. It will also allow to combine physical and virtual production.</p> <p>The infrastructure being built within RICAIP will serve as a very special means to show the new technologies, methods and solutions to a wide range of audience and key actors.</p>
Unique testbeds network	The first concept of testbeds was carried out within RICAIP, Phase I at CIIRC CTU and CEITEC BUT. The second phase is aiming to the building of the RICAIP	Fully integrated and interconnected distributed facility of RICAIP project, composed of Czech and German testbeds and prepared for further joining the European testbeds ecosystem.

<sup>1</sup> Further suggestions in the table were added according to the Exploitation Activities in Horizon 2020 presented by EC in: [https://ec.europa.eu/research/participants/data/ref/h2020/other/events/2018-09-21/9\\_dissemination-exploitation-activities\\_en.pdf](https://ec.europa.eu/research/participants/data/ref/h2020/other/events/2018-09-21/9_dissemination-exploitation-activities_en.pdf) (slide 10) and according to RICAIP KPIs (Fig. 7).

	<p>Industrial Testbed Core which is based on newly established experimental facilities in Prague, Brno and the existing facility in Saarbrücken.</p>	<p>The RICAIP Industrial Testbed Core will represent a new research and experimental workplace for testing innovative solutions and processes of advanced and fully integrated multi-site industrial production.</p>
<p><b>Knowledge and technology</b></p>	<p>Knowledge obtained at engineering and/or research projects is usually closed by the provider of the knowledge. The knowledge about the processes and machines is usually stored in text descriptions or databases, which do not allow for efficient linking of pieces of knowledge and building complex knowledge systems composed of partial pieces.</p> <p>RICAIP project is based on a strategic long-term collaboration and intensive knowledge and expertise transfer from German to Czech partners, for all levels of research, innovation, technology transfer and ERA priorities. After the finalization of building of RICAIP project experimental facilities, the knowledge transfer will be</p>	<p>Semantic representation of product features and machine capabilities allows building knowledge graphs to reason about more complex questions, match product requirements and machine capabilities, describe supply chains in a semantic way and so on. Such knowledge graphs can also be used to transfer knowledge among machines or to build simplified views on production even if there are complex and large sets of data the views are based on and other functionalities.</p> <p>Separate area of knowledge transfer are the trainings that will be offered to transmit the exploitable results to additional industrial or research partners. Training will also cover the public to transfer the knowledge at a corresponding level to the citizens and society to improve their perception about the advances of technologies and methods, which</p>

	<p>provided towards external subjects, primarily SMEs.</p>	<p>will be influencing the society more and more.</p> <p>Services form a specific type of knowledge transfer that allows not only for offering end users new learnings, but provides also certain solutions that fit to the end users' specific requirements.</p>
<b>Methods</b>	<p>Methods developed during research projects are typically published in scientific journals and conferences.</p>	<p>The methods will be also applied in the distributed production environment built within the RICAIP framework and brought closer to real-life applications, which will support their exploitation.</p>
<b>Networks</b>	<p>The exploitation result contributes to greater access to the EU research sources. RICAIP partners are part of, among others, AI DIHs, AI4EU, euRobotics, CLAIRE, ELLIS, Robo Com++, EIT, BDVA, AENEAS networks.</p>	<p>Networking activities planned within RICAIP Grant Lab Strategy enables RICAIP center to connect with research initiatives across Europe (such as CLAIRE Initiative, ELLIS, AI DIH, etc.) and contribute to the scientific, technological, economic, and societal knowledge advancement. The current engagement of RICAIP partners in variety of EU networks accelerate the potential to leverage RICAIP beyond the original project consortium and access the EU research/industrial sources. Furthermore, RICAIP Centre, via its partners will further focus on expanding the existing research</p>

		capacities to reduce the fragmentation of the scientific community through the creation of tighter networks of existing AI centres.
<b>Protected IPs</b>	This exploitation result is directly related to the finalization of experimental facilities.	The intellectual property presents the main result of the individual research effort within RICAP. The concrete rules related to its protection will be defined within the RICAIP's IPR strategy, based on the key principles defined within consortial Agreements and the EC regulations.
<b>Open source research results</b>	This exploitation result is directly related to the finalization of experimental facilities.	The RICAIP Project follows the European Commission's principles based on open access to the research findings and participates in the Open Research Data (ORD) pilot action. RICAIP counts with primarily these types of open-source exploitation results: <ul style="list-style-type: none"> <li>➤ Peer-reviewed manuscripts, scientific papers</li> <li>➤ Software</li> <li>➤ Data sets</li> </ul>
<b>Services</b>	Services provide by the consortium in form of consultancy, expertise etc. will ensure the project's sustainability.	The services provided by each partner will be designed as joint services within RICAIP project on one side, but at the same time, they should also reflect the specific needs and challenges of the production environment in

		<p>Bohemia, Moravia and Saarbrücken.</p> <p>Pre-designed types of service are e.g.: proof of concept, expertise, consultancy, new product/processes testing, workshops, lectures, trainings etc.</p>
<p><b>PhD thesis, educational materials</b></p>	<p>RICAIP mission is to contribute to education and training of highly qualified professionals for research, industry, and public.</p>	<p>RICAIP project is thanks to its partners closely connected with the Czech and German technical universities. One of the key principles of RICAIP is to build an excellent science based on a wide talent pool and highly qualified researchers. The contribution to education will be ensured by several types of educational activities, such as workshops, lectures, training etc.</p> <p>The PhD thesis are planned as a tool motivating young talents to join RICAIP team and at the same time, to take part in complex research tasks related to AI, robotics, embedded systems etc.</p>
<p><b>New products</b></p>	<p>New products brought to the market will accelerate innovations; improve product portfolio; contribute to the novel smart, safe and sophisticated solutions for the advanced industrial</p>	<p>New products generated within RICAIP project are closely connected to the RICAIP activities in the next stages of the project implementation, based on:</p> <ul style="list-style-type: none"> <li>➤ joint projects in cooperation with the innovative,</li> </ul>

	production to reaching the market.	technological companies, start-ups; <ul style="list-style-type: none"> <li>➤ commercialisation of RICAIP research results;</li> <li>➤ business development activities of a newly set up spin-off company.</li> </ul>
<b>Further research and synergic projects</b>	CIIRC CTU, CEITEC BUT and DFKI have participated in joint proposals under H2020 ICT-48-2020 call (e.g. RIA: ETERNITIS, CSA: VISION) in 2019.  Running projects: Cluster 4.0, DaMIAS, DeepSpA.  RICAIP Grant Lab strategy has been established (D3.3).	Further research connected with the new synergic projects will bring an opportunity for sustainable financing of RICAIP activities and will allow to reflect current research challenges and to present the state-of-art complex solutions in the field of advanced industrial production, AI, industrial robotics and related disciplines. As one of the instruments supporting further research activities in collaboration with industrial companies, innovation labs, including “living” labs are planned within RICAIP.  An important aspect of the further development of RICAIP project is also interdisciplinary and pro-growth approach gathering the sufficient amount of international excellence and research capacities.
<b>Spin-off/ Start-up companies</b>	Newly established spin-off companies would accelerate innovations; improve product portfolio; contribute to the	Newly established start-up company “ <a href="#">TRIX Connections</a> ” has the exclusive license as the CTU start-up.



	<p>novel smart, safe and sophisticated solutions for the advanced industrial production to reaching the market.</p>	<p>“TRIX Connections” provide cooperation with production companies and participate in the research and development of the protective device as part of the fight against the COVID-19 pandemic.</p> <p>The research team of the Testbed for Industry 4.0 at CIIRC CTU, whose research infrastructure is an integral part of RICAIP, reacted on the urgent need and started to develop half-mask prototypes to be used in hospitals. The CIIRC RP95-3D half-mask, a personal protective device with an exchangeable P3 filter, was certified. More can be found on <a href="#">EC F&amp;T portal of project results with relevance to COVID-19</a>.</p>
<p><b>Societal activities</b></p>	<p>The exploitation result is closely related to the RICAIP aims to address the challenges of industrial production and also to take advantage of the social implications of Industry 4.0.</p>	<p>The fourth industrial revolution, as the driver of industrial and societal change, unlocks new opportunities for growth in qualification, flexibility, and creativity of people, thus opening the possibilities for several groups of population to participate in the workforce in a new way and with new quality.</p>

Figure 5: KERs Analysis

RICAIP partners will implement exploitation activities across several topics that will arise during the project. Main topics are:

- Research Areas;
- Research results, project->scientific excellence;

- Technology, infrastructure, demonstrators, best practices;
- Services;
- Networks.

During its development RICAIP partners will be focused on different research areas and various research groups. It will ensure to highlight all research results and developments. Accordingly, the Center will provide insights in technology, infrastructure, demonstrators and services.

Scientific results will be published in various forms as explained in 4.1. This way the scientific excellence of RICAIP Research Groups will be presented, and at the same time new scientific and industrial partners would be attracted. Also, RICAIP Centre will work towards establishing a scientific network / community through open access measures, scientific events, conferences.

During its development, RICAIP project will be committed to enable transfer of knowledge and experience towards the research and industrial community. It will make available its use-cases, cooperation and best practices with industry. Accordingly, it will provide opportunities for common research and R&D contracts.

The Centre will support and license intellectual property. As already explained in details in 4.1, RICAIP project plans to provide academic and scientific services such as research, studies, projects, lectures, workshops and trainings. Also, it will ensure career opportunities such as study, thesis, PhD dissertations, and jobs. Moreover, there will be a strong impact on industrial R&D and R&I services such as consulting activities, projects etc.

RICAIP consortium is strongly committed to recruiting new collaborators and creating new networks outside the RICAIP already established partnership.

Other topics can rise during the RICAIP development, therefore RICAIP's plan of exploitation activities will be updated in accordance with further developments.

### 4.3 Key actors

The exploitable results will be targeted at the key actors to allow for improving the acknowledgement of the new technologies and methods, and to allow for their leverage in real-life applications. The knowledge transfer realized as trainings and workshops will help in this effort and will be focused on the respective target groups, which form the key actors as defined by the RICAIP project. The key actors will include:

**Research Communities and Academia** which will benefit especially from knowledge transfer and methods, partially also from technologies. Networks will contribute to sharing the knowledge to a greater extent among various research groups and, on the other hand, to gathering knowledge in the opposite direction to increase the global knowledge within the respective networks.

**Industry, Innovators and SMEs** which will benefit from technologies, knowledge transfer and methods. Participation in the networks will also contribute to increasing their awareness about modern methods and approaches, and to bridging the gap among separate technological solutions.

**Relevant I4.0 networks** will benefit from a competitive and sustainable ecosystem in the field of advanced industrial production on the European level.

**Civil society and Citizens** will benefit from getting the knowledge about modern approaches in a specific way that will help them understand modern trends and support their imagination how the modern technology and methods can improve people's lives. The trainings will also contribute to citizens feeling comfortable when encountering new technological and scientific developments.

**Policy makers / Public authorities** will benefit from the knowledge transfer in terms of attending trainings, and from learning real-life use cases and best practices, which will show the possible new directions in research and innovations.

Key Actors	Opportunities	Barriers/risks
<b>Research Communities</b>	<p>As the fourth industrial revolution binds companies and countries together through worldwide flexible supply chains and data networks, it will increasingly promote globalisation.</p> <p>RICAIP centre is one of the prominent implementation mechanisms of how to become a trustful partner within the European research infrastructure, how to expand existing key partnerships and to build new ones in a close interaction with the globalisation process of Industry 4.0 (I4.0).</p>	<p>Economic, social and organizational risks across the research community.</p>
<b>Academia</b>	<p>One of the missions of the RICAIP project forms to contribute to education.</p> <p>Students will be engaged via lectures, project work, PhD Thesis etc. RICAIP brings new research opportunities for young talents and researchers in form new job opportunities. RICAIP project aims also to</p>	<p>Low interest of students in technical fields, lack of financial resources for setting up spin-off/start-up companies, legal obstacles.</p>

	create a motivating environment for the setting up spin-off/start-up companies.	
<b>Industry / SMEs</b>	<p>Application in automotive, aircraft and machine manufacturing.</p> <p>SMEs and also large companies as the target group of technology and knowledge transfer, consultancy and services in form of e.g. testing and verifying the properties and functionality of new products, technologies or processes etc.</p>	<p>Entering the new industrial sectors, given the RICAIP Centre development; Sustainability.</p> <p>Low awareness of the principles of Industry 4.0 among SMEs.</p> <p>Low readiness of SMEs (technological, financial) to introduce innovative processes into production.</p>
<b>Relevant I4.0 networks</b>	<p>RICAIP project in connection with the partners in the wide I4.0 related network (e.g. partner projects, DIHs &amp; EDIHs, industry-driven initiatives, clusters, associations etc.) aims to build a competitive and sustainable ecosystem in the field of advanced industrial production on the European level.</p>	<p>Lack of synergic topics, fragmentation of interests.</p>
<b>Civil Society and Citizens</b>	<p>Low diversity in technically oriented research domains; Insufficient multidisciplinary cooperation; Low industrial involvement in joint collaboration; Low</p>	<p>Protection of human intellectual and social capital as one of the Centre's most important assets.</p>

	internationalization and mobility;"Hybrid skills"; Multi-skilled teams.	
<b>Policy makers / Public authorities</b>	Policy makers seeking to drive innovative, technological and economic development on the regional, national and European level in connection to the strategic documents and roadmaps, such as Innovation Strategy of the Czech republic 2019-2030 etc.: "...the government accepts the changes known as Industry 4.0 and will support research and development that will strengthen the Czech Republic's position in the world, especially in artificial intelligence and the digitalization of branches of the economy."	Elections, world economic development, global changes with the impact on the whole society which have the potential to change priorities of political leaders (e.g. environmental, health threats).

Figure 6: Exploitation KAs Analysis

## 5 Key performance indicators

Below follows the list of indicative KPI values regarding the appropriate mixture of dissemination and exploitation results based on 857306 RICAIP proposal. Chapter 4 provides an in-depth description of the exploitation results and planned activities within the RICAIP exploitation plan.

RICAIP indicative list <sup>2</sup> of KPIs related to Exploitation Plan <sup>3</sup>			2019	2020	2021	2022	2023	2024	2025 (Total)
KPIs on scientific excellence	6	Number of peer reviewed publications	0	8	20	60	125	200	280
	7	Number of presentations at scientific conferences	2 (0) <sup>4</sup>	12	35	88	130	190	260
	8	Number of PhD dissertations defended	0	0	0	0	1	8	12
	9	Number of scientific awards	0	1	3	3	4	4	5
Innovation performance related KPIs	10	Joint patents	0	0	0	0	0	0	2
	11	Multi-site demonstrators / use cases performed	0 (1)	1	4	5	7	8	10
	12	Number of other IPRs protected	0	1	3	5	5	8	10
	13	Number of spin-off companies established	0	0	0	0	0	1	2
	14	Number of new products brought to the market	0	0	1	1	2	3	5
KPIs on human capital and HR development	20	Joint educational & training programmes	1 (0)	3	5	7	9	15	20
KPIs on dissemination	22	Workshops and seminars on RICAIP and	1(14)	4	10	17	24	30	37

<sup>2</sup> The indicative list has been taken from original RICAIP proposal, values related to exploitation activities.

<sup>3</sup> KPIs from 2020 will be timely updated.

<sup>4</sup> KPIs in brackets denote achieved values in 2019

<b>and communication</b>		<b>Industry 4.0, visits, lab-tours</b>							
	<b>23</b>	<b>High-level meetings incl. stakeholders</b>	3 (3)	9	15	22	28	32	35
	<b>24</b>	<b>Industrial Tested networking activities</b>	0	0	0	1	2	4	7
	<b>25</b>	<b>Press echoes</b>	5(14)	9	13	18	22	29	37
	<b>26</b>	<b>RICAIP website reach (+ social media)</b>	800 (1100)	1200	2600	4500	6800	9600	14000
<b>Societal KPIs</b>	<b>27</b>	<b>Seminars on I4.0 &amp; personnel development and labour market</b>	0	1	3	6	9	13	18
	<b>28</b>	<b>Seminars on I4.0 &amp; environment and sustainability</b>	0	0	1	2	4	7	10
	<b>29</b>	<b>Seminars on I4.0 &amp; Society 4.0</b>	0	1	2	5	8	12	16
	<b>30</b>	<b>Seminars on I4.0 &amp; Gender</b>	0	1	3	5	8	11	14
	<b>31</b>	<b>Seminars on I4.0 &amp; Smart City and Smart regions</b>	0	1	3	5	7	9	11

Figure 7: Exploitation related KPIs

Peer reviewed publications, presentations delivered at the scientific conferences, PhD dissertations defended and scientific awards will disseminate knowledge, enhance reputation and provide open access to scientific results. They will also certainly provide opportunities for networking.

Newly established spin-off companies and new products brought to the market will accelerate innovations; improve product portfolio; contribute to the novel smart, safe and sophisticated solutions for the advanced industrial production to reaching the market.



Multi-site demonstrators / use cases performed will aim at develop and verify future applications of the new manufacturing concepts for the most relevant industrial sectors (aircraft, automotive, and production technologies).

Number of IPRs protected are expected to primarily broaden the pool of commercially attractive technologies, methods and solutions and provide smart, safe and sophisticated solutions for the advanced industrial production ready to be offered to the application sector.

Technically oriented workshops in the field of advanced industry should provide an opportunity for strong collaboration with the strategic industry; and furthermore positive impact also on ecosystem of the academic sector, large industry and SMEs (suppliers, start-ups).

Testbed working activities will enable building the community in the field of advanced industrial production, AI, industrial robotics and related disciplines. At the same time, they will allow for knowledge transfer, share and exchange in the respective field.

Press echoes and activities on RICAIP website and social media profiles are primarily aiming to raise the awareness of RICAIP, and various aspects of its development, successes, and project results.

I4.0 related seminars will provide opportunities for non-technical fields and increase potential for new jobs and improve the skills. In addition, seminars will contribute to smart solutions for cities, improved transportation and logistics processes.

## 6 Conclusion

Current state of the Exploitation plan has presented RICAIP's general joint exploitation strategy describing several major activities. The Plan provides list of explained key exploitable results and key groups involved in exploitation of the results. All RICAIP partners are committed and involved in the joint exploitation strategy in order to ensure successful exploitation of the results of the project.

This deliverable is considered a flexible, living document that shall help RICAIP and its partners develop a comprehensive approach to the exploitation activities. Therefore, the update to the exploitation main activities along with its KERs will be provided. . As also

foreseen by the RICAIP Project, the document will have an update on regular 12-18-month basis.