



PROJECT DELIVERABLE REPORT



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Table of Contents

1	Summary.....	4
2	Introduction.....	4
2.1	Purpose and Scope	5
3	Lesson learnt in the OA project.....	5
3.1	Main achievement and lesson learnt of the OA project.....	5
4	Identification of the effective communication strategy.....	12
4.1	What is communication and why it is important	12
4.2	Communication plan developed in OActive project.....	12
4.2.1	Communication strategy developed in the OActive project.....	12
4.3	Achievement and lesson learnt in the communication strategy.....	13
4.3.1	Communication tools	13
4.3.2	Website	13
4.3.3	Social media	14
5	Identification of the effective dissemination strategy	14
5.1	What is dissemination and why it is important.....	14
5.2	Dissemination plan developed in OA project.....	15
5.3	Achievement and lesson learnt in the dissemination strategy	15
5.3.1	Dissemination tools	15
5.3.2	Newsletters.....	16
5.3.3	Publications and Open Access Repositories	16
5.3.4	Technology watch section of the website	17
5.3.5	Dissemination Events	17
5.3.6	Cordis wire	18
5.3.7	Paid campaigns	18
5.3.8	Innovation Radar	19
6	Exploitation strategy: lesson learnt and main outcomes	20
7	Conclusion	22
	Annex 1	1
	Annex 2	2

1 Summary

This document is linked with Deliverable 10.3 “Best practices handbook”, which includes valuable information and lessons learnt, that can be considered as a guide for future use. The tools analysed in this report can be divided into:

- i. the lessons learnt targeted to the OActive project concept,
- ii. followed by the fundamentals of scientific communication to be addressed to different audiences,
- iii. and the exploitation- and main outcomes- related best practices.

The lessons learnt are a result of communication with the individual partners of the consortium, as well as with the Dissemination and Exploitation Manager of the project in order to include also best practices in terms of Communication, Dissemination and Exploitation of the project outcomes. The lessons learnt are summarized in easy to read figures in order to highlight the take away messages in a comprehensive way.

The specific objectives of OActive project include the following actions:

- a. To develop in silico multiscale biomechanical models of healthy and knee joints with OA based on subject-specific joint and tissue level experimental mechanics
- b. To model biochemical health indicators and inflammatory biomarkers that will be used to assess a number of different systemic and joint condition indicators.
- c. To detect user's physical, mental and social behaviours and identify higher-level physical, mental/emotional, and social states of the user and information that can be used for providing individualised diagnosis and recommendations for patient-specific treatments
- d. To develop the hyper-modelling framework of OActive
- e. To employ an ontology-based framework for data /models reusability and sharing
- f. To implement personalised interventions using Augmented Reality (AR)
- g. To test the OActive system using a comprehensive validation strategy that includes clinical studies, in vitro clinical trials and validation in large data registries.

2 Introduction

This section synthesises lessons learnt during the development of the project, in order to identify issues that occurred, challenges and strategies to avoid similar drawbacks arising in the future. It is important to note that both, achievement, challenges, successes and improvements, have been included. The key issues described below are:

- Identification of activities or areas needing additional attention,
- Useful conclusions, regarding the organisation of work, collaborations, clinical trials procedures, training of models and, in general, collection of all required data and
- Identification of effective activities or strategies, to face any drawbacks.

2.1 Purpose and Scope

The identification and documentation of lessons learnt is a process that provides the best opportunity for improvement. The main aim of this document is to gather all relevant information for better planning of future projects and future treatments, minimizing potential risks and improving the assessment of possible challenges occurring. In brief, the scope of the report and the main goal is:

- a) provide guidelines for projects in the same fields based on the learnt lesson in the OActive project;
- b) provide some instruction for the communication, dissemination and exploitation strategies highlighting the importance of the involvement of the general public and target stakeholder for the success of the project

3 Lesson learnt in the OA project

The goal of the OActive project was to make a significant leap forward developing patient-specific predictive computer-based models and simulation tools for understanding the development and progression of a major disease, such as osteoarthritis (OA). In order to achieve this goal a set of intermediate objectives was articulated, including the following:

- To develop in silico multiscale biomechanical models of healthy and knee joints with OA based on subject-specific joint and tissue level experimental mechanics that will be capable of predicting tissue loading and responses in individuals and provide inputs for the mathematical ‘hyper-models’ accounting for mechanical loading of tissues in different conditions and individuals.
- To model biochemical health indicators and inflammatory biomarkers that will be used to assess a number of different systemic and joint condition indicators.
- To detect user’s physical, mental and social behaviours and identify higher-level physical, mental/emotional, and social states of the user and information that can be used for providing individualised diagnosis and recommendations for patient-specific treatments.
- To develop the hyper-modelling framework of OACTIVE empowered by big data that would include personalized predictive Decision Support (DS) models which address specific OA stages in the disease continuum of a patient.
- To develop an ontology-based framework for data/models reusability and sharing.
- To deliver personalised interventions using Augmented Reality (AR)
- To test the OACTIVE system using a comprehensive validation strategy.

3.1 Main achievement and lesson learnt of the OA project

All project partners were asked to single out at least one best practice/lesson learnt acquired throughout the project’s lifetime. These best practices could be related to data collection protocols, recruitment of patients, data storing and accessibility, development of mechanistic models of the musculoskeletal system, systemic health and inflammation modelling, tissue engineering and osteoarthritis models, behavioral, social, environmental modelling, hyper-modelling empowered by big data, personalised interventions using Augmented Reality, technologies integration, integrated system validation and ethical aspects, etc.

The best practice should be in the form of new/innovative ways of working, improved methodologies, trial and error outcomes, new protocols that will enhance the procedures followed in future management of OA and other chronic/bone & cartilage diseases.

Uni Nicosia

The University of Nicosia shared best practices that relate to blood collection, handling, and storage, as follows:

For the collection of blood, separation of plasma, and long storage of the samples we followed the rules proposed by the Standard Operating Procedures Internal Working Group (SOPIWG)/ Early Detection Research Network (EDRN) for specimen collection¹ (including blood samples) and management for biomarker discovery and validation. All blood samples were stored at 4°C to prevent hemolysis and proceeded within 4h after collection. It should be pointed out that plasma was selected over serum for the determination of the levels of the selected biomarkers in blood samples from OA patients because during the coagulation process lysis of cells in the clot may occur, releasing cellular components not usually found in serum samples. Moreover, we selected EDTA as an anticoagulant because it does not interfere with the ELISA assays. Also, we developed our Standard Operating Procedure (SOP) for the blood collection, as well as for storage and handle of plasma samples to ensure that all samples were handled in the same manner throughout the entire process of biomarkers determination.

Blood collection

Ten (10) mL of whole blood were collected for OA patients using needles of diameter >23 gauge to prevent hemolysis and were immediately transferred into commercially available EDTA-treated tubes (lavender tops). Tubes were inverted carefully 10 times to mix blood and anticoagulant and stored at 4°C until centrifugation.

Plasma isolation, aliquoting, and storage

To separate plasma from blood-cells samples were centrifuged at 1500g for 20 min at 4°C using a refrigerated centrifuge. The resulting supernatant was designated as plasma. Following centrifugation, the liquid fraction (plasma) was immediately transferred into clean cryovials using a sterile serological pipette. The samples were maintained at 2–8°C while handling. Based on EDRN guidelines for specimen collection, plasma/serum samples are of better quality for analysis if smaller volume aliquots are initially prepared rather than larger ones that have to be thawed, handled, and refrozen, perhaps multiple times. Thus, plasma samples were stored in 0.5-1.0 mL aliquots, at -80°C in two different locations. Also, relating freeze-thaw cycles of the plasma samples were avoided. All samples used were clear and transparent.

CERTH

CERTH commented on the replicability of their OActive results in future research in the field of personalized medicine. They also highlighted the fact that external disruptions that are not easily foreseen, such as the Covid-19 pandemic, could delay medical projects and alienate the project partners.

OActive's contribution to understanding the pathophysiology of Knee Osteoarthritis is important for the scientific community. The development of robust hybrid feature selection techniques combined with interpretable models, graphical models, and geometric feature extraction techniques has led to a significant

¹ Tuck, M. K., Chan, D. W., Chia, D., Godwin, A. K., Grizzle, W. E., Krueger, K. E., Brenner, D. E. (2009). Standard operating procedures for serum and plasma collection: early detection research network consensus statement standard operating procedure integration working group. *J Proteome Res*, 8(1), 113-117. doi:10.1021/pr800545q

degree of understanding of Knee Osteoarthritis. Hence, individualized models were developed for both the prediction and the diagnosis of the disease, as well as techniques for their interpretation. All of the above is know-how that could be used in any project for Healthcare.

On the other hand, the covid-19 pandemic led to limited technical discussions of the OActive for the knowledge extraction and the personalised models. Moreover, it caused a huge delay on the implementation of the project by affecting the flow of the measurements, which were used for the evaluation of our personalized models. Therefore, another lesson learnt for CERTH is the importance of effective remote working and on-line engagement with peers and project partners.

UPAT

Within OActive, University of Patras derived best practices in relation to the requirements and the way of effectively developing AR interventions in clinical settings. They developed a new loop methodology of delivering AR games in the field of personalized medicine, as follows:

1. Best practices for real-time musculoskeletal modeling include a step-by-step verification and validation procedure of the results in different levels of analysis, comparing results against data from offline analyses and published studies.
- 2a. Moreover, critical thinking on outcomes in every step of the modeling workflow should be continuously applied to ensure sound modeling practices of human motion.
- 2b. Furthermore, designing applications integrating AR elements demands “thinking-out-of-the-box” skills, since AR can be utilized in several ways (and on a number of different devices) and, therefore, designers need to think carefully about the context and function of the AR experience. AR-powered game design for patients in a clinical setting should be dictated by the nature of the intervention plan per instance, thus careful consideration should be given to both clinician’s and patient’s needs.

SMARTEX S.R.L

SMARTEX S.R.L identified lessons learnt that relate to project management and prioritization of tasks. The evolution of OActive project helped to point out that, close collaboration among project partners is essential in order to address bottlenecks and challenges.

Their design methodology follows a user-centred approach with the objective to meet the needs of the end-users, aiming to achieve an optimal satisfaction level and experience of use with a minimum effort. Within OActive project, due to the pandemic emergency, the interaction and involvement of the users were limited; to overcome the lack of inputs deriving from the users’ experience, crucial for the refinement of our wearable tools; the phase dedicated to the acquisition of requirements has been extended and iteratively applied, exploiting the experience of the project partners with the OA patients.

Due to the iterative acquisition of research requirements, two different platforms have been identified, which leads to the conclusion that the timing of the learning process impacts the definition of the requirements and the efficiency of the designed solution.

TIME.LEX

TIME.LEX derived as a best practice an updated way of introducing and leading data protection and ethics matters within EU funded projects and beyond, based on the following remarks:

Some aspects of data protection and ethics compliances need to be considered by the whole consortium during the proposal stage already, and this should at a later stage be reflected in the allocation of time/personal month to all partners. Indeed, some compliance activities, such as a data protection impact assessment, or the implementation of a data anonymization strategy, require time-consuming input from all partners, which should be imputed on dedicated resources, to foster the involvement of all partners.

Furthermore, data protection and ethics compliance must be considered throughout the project and initiated as earlier as possible in the project to be fully included in the reflection process, and as an integral component of the development process undertaken by the partners.

HULAFE

For HULAFE the work they delivered within OActive, the collaboration they had with project partners, and the exposure they gained to other EU funded projects in the field of chronic (joint/inflammatory) diseases, made them identify as a lesson learnt the fact that they should invest more and continue being actively involved in the area of OA prediction. In more detail, the performance of the clinical studies on healthy people and subjects at risk of osteoarthritis has shed light on the complexity of an accurate early diagnosis of osteoarthritis. The evidence of this issue is leading HULAFE to focus their attention on the importance of perfecting this diagnostic process, based on scientific research, and planning further studies on this matter.

KU Leuven

Firstly in order to study the importance of contextual and environmental factors in knee OA, KU Leuven further developed a heuristic classification of contextual factors for the OActive project, based on the World Health Organisation's International Classification of Functioning, Disability and Health (ICF). Merging protocol data (outcomes) from major knee OA cohorts, expert clinician opinion within the consortium and input from experienced librarians, a comprehensive search strategy on contextual factors in knee OA was formulated. This work can be timely updated for future scoping or systematic summary of the literature by our or other research groups. Within the OActive project, focus was on the major gap of knowledge on socioeconomic factors in knee OA. State-of-the-art systematic review methods were applied via a recently developed platform Rayyan to facilitate study selection and processing. Also, the Nottingham Ottawa Scale for quality appraisal was adapted to allow for bias scoring from open label to fully randomised controlled designs. Taken together, the broad search strategies developed will facilitate future quick scoping and in-depth review of contextual factors in knee OA.

Secondly, support was given by KU Leuven to the biomechanical content of the OActive project. Substantial developments and customization have been made regarding the in-house available personalised musculoskeletal modelling workflow: (<https://simtk.org/projects/opensim-jam>), which is subsequently used in the estimation of joint angles, moments, ligament and muscle forces, and cartilage contact parameters (i.e., pressures and centre of pressure). Further, an automated workflow was developed for both generic and subject-specific modelling, specifically geared towards the OActive datasets and which has been made available for other project partners. This flow was merged with existing knowledge on the definition of progressors/non-progressors in the existing KU Leuven EVOLVE cohort to provide a proof-of-concept of biomechanical differences between progressor and non-progressors with knee OA.

CETRI

During the OActive project, CETRI's derived best practices related to more efficient ways to implement data protection and privacy rules dictated by the GDPR directive.

Besides implementing the data protection rules, where the best practices are well-known and documented, integrating GDPR rules into the system architectures requires an entirely different mindset from the developers' side. Admittedly, the complexity imposed by the GDPR rules in the system's architecture required continuous feedback from all stakeholders that led to revisions in some critical parts of the OActive platform.

An agile development methodology could be more appropriate in the development of such systems. Splitting the whole process into short developing cycles can lead to less complex and time-consuming procedures.

LEITAT

For LEITAT, two main areas are highlighted in terms of improvement of practices and technologies inside OActive project.

1. LEITAT has implemented in human data and samples the procedures to ensure the ethical and safety regulations. Sample storage in safe -80°C freezer and registration of the sample entry/internal deliver or processing was recorded. In this regard, the access to the main data and samples have been limited to IPs, lab manager and Head of the Department.

2. Biomarkers' research is continuously evolving, so improvement in strategies to increase the robustness of the results, as well as, improving the cost/benefit, have been evaluated during the project. With this aim, the initial strategy for analysing has been modified with a direct quantification of miRNA of individual samples by a qPCR using an array of 754 miRNA array. In this way, correlation studies of the whole miRNA data with OA K&L scores, sex, age, weight and BMI can be done and, selected miRNA will be validated using the complete set of samples. This strategy will be implemented as a platform in the Drug Development group for future projects dealing with biomarkers.

LJMU

LJMU was involved in the development of *in-silico* models to predict knee joint loading and cartilage stresses using motion capture data collected by other partners. Models and pipelines were developed to allow the development of complex musculoskeletal and finite element pipelines using open-source software. This commitment to using open-source software did lead to some difficulties in the early stages of the project when trying to ensure compatibility and communication between all parts of the pipeline, but the use of such software greatly enhances the translatability of the methods and makes it far easier for other potential end-users to replicate the work without needing to pay for expensive software licenses.

In terms of the models themselves, several elements of best practice were put in place including the need to coordinate the collection of motion capture and MRI data prior to the commencement of data collection, particularly when multiple data collection partners are involved. The choice of marker set, protocols for gait analysis, and protocols for MRI collection are very important in ensuring that data can be processed in a standardized way using the *in-silico* models. Because we were able to ensure consistency between the approaches at different partners, the outputs from the models were able to be compared more readily and significant inconsistencies were avoided.

This project was very complex, with data being collected and processed across many different international centers. LJMU was involved in processing much of this data and so relied upon the data being easily shared between partners and protocols being put in place to do this efficiently. One lesson learnt in this project

was the need to develop these systems as early as possible so that data can be shared easily and quickly once it starts being collected. Because we did not have systems in place to handle the sharing of large MRI sequences until fairly late in the project, the development of some of the more complex finite element models could have been compromised. As it was, robust and efficient methods were put in place in the latter part of the project, and these did facilitate the sharing of data more easily between partners and the *in-silico* work carried out at LJMU was able to be completed.

ANIMUS

Within OACTIVE, ANIMUS gained much experience through the collaboration with the other partners participating in this project, in regards to the collection, organization, sharing, and protecting important and sensitive personal data of the participants in this study.

The knowledge obtained by the study of athletes post-injury can be used for the study, early prediction and rehabilitation of other vulnerable populations, such as neurological patients with mobility problems, who can develop OA and are among the patients who often need rehabilitation services. Especially, gait analysis with specialized equipment proved to be a very important tool for the identification, assessment and recording of parameters related to the development of OA, and should be used for the assessment of patients in danger of developing OA in the future.

The main best practices, categorised in general lessons learnt and technical lessons learnt found in the next two figures.

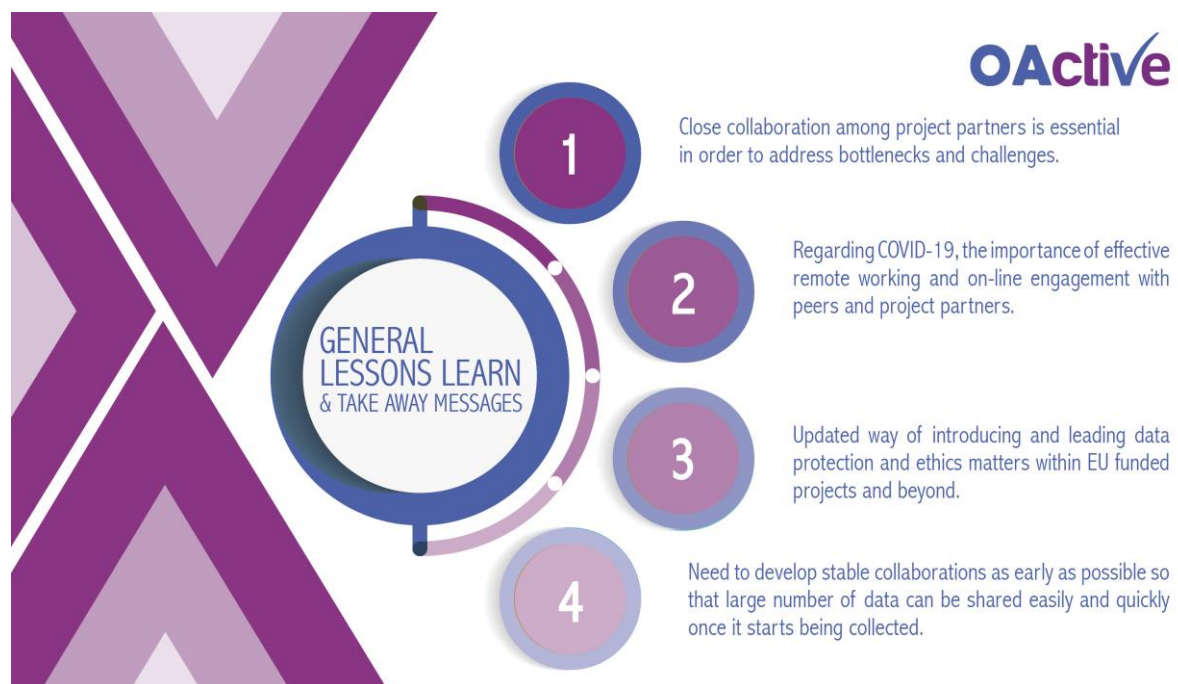


Figure 1. General lessons learnt and take away messages.

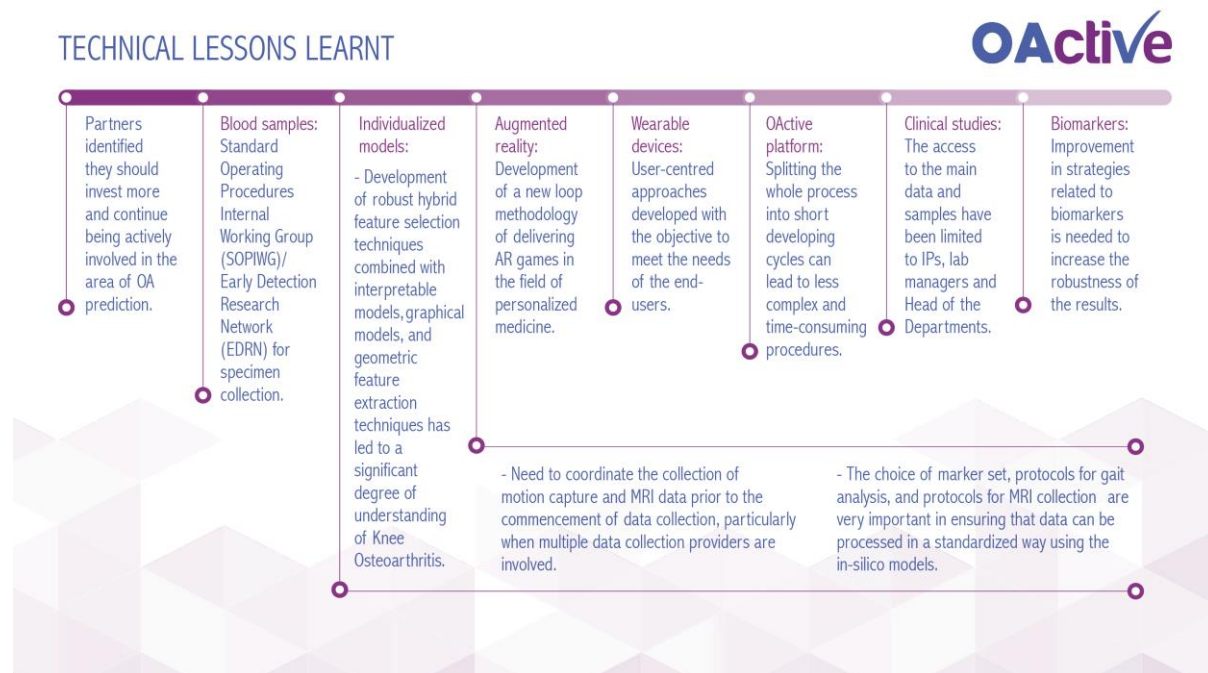


Figure 2. Technical lessons learnt.

4 Identification of the effective communication strategy

4.1 What is communication and why it is important

Based on the EC definition, communication is a strategic and targeted measure for promoting the action and its results to a wide audience, including the media and the public. Communication is a fundamental aspect of a project for several reasons:

- Highlight the importance of the project;
- Promote the project beyond the project's community, to reach the society and relevant stakeholders
- Communicate the project to not specialists

Communication is different from dissemination in several aspects. Firstly, communication starts from the beginning of the project, even before the first results of the project are produced. Communication addresses the project's content to multiple audiences and not only to the scientific community. In several EU projects, the final user of the scientific research is not only academia or a specific industry but could also be the general public. This is indeed the case of the medical sector and the action of making the relevant audiences aware of the new developments is of outstanding importance for the project's success.

The most useful instruments supporting communication are social media, website, but also conferences, trainings and so on. In conferences, it is possible to reach a specific audience through posters or oral presentations. However, the distribution of communication material such as flyer or leaflet, increase the possibility to spread the project content and to reach a wider audience.

4.2 Communication plan developed in OActive project

4.2.1 Communication strategy developed in the OActive project

The communication strategy was developed to raise awareness around the Osteoarthritis predictive models aiming to early diagnosis and prognosis of the disease and to encourage citizens in Europe to engage in the OA topic.

Communication material can act as tools to promote efficiently the project and by having a specific project identity the results are easily linked with the specific project and their visibility is increased.

As part of the communication strategy, the first important action taken was the setting up of the [OActive website](#) and the social media accounts (Facebook, LinkedIn and Twitter) and the production of communication material such as flyer, brochure, leaflet, press releases, customizable visual materials dedicated to specific events, poster, the OActive teaser video and a roll-up. Attendance at events, workshops, info days etc. has been included in the communication plan as one of the main ways for promoting the project activities. Other activities were implemented to support the communication such as:

- Regular Skype calls, emails, face-to-face project meetings and workshop between partners
- Engagement of stakeholders closely involved in the project
- Communication with the general public, medical community and policy-makers

4.3 Achievement and lesson learnt in the communication strategy

The communication strategy has been effectively developed during the projects. Thanks to the material prepared, the website and social media accounts, key stakeholders in the medical sectors and patients were informed about the OActive technologies and the effective ways of preventing OA.

4.3.1 Communication tools

At the beginning of the project, it is, therefore, important to develop an effective communication plan, where the following activities need to be considered:

- Project logo and project identity specified from the beginning of the project
- Website updates/news
- Project brochures, Leaflets, Roll up
- Media reports/ appearance
- Project poster
- Video
- Social media
- Contribution to academic conferences
- Project workshops
- Stakeholder engagement
- Scheduled weekly meetings

Communication material presents in an effective and comprehensive way the project concept and goals aiming to attract the wider public, as well as relevant stakeholders.

4.3.2 Website

The project website (<http://www.oactive.eu/>) was created at the beginning of the project. The scope of the website is to promote the project and reach the Healthcare industry, OA patients, academia, policymakers and stakeholders, even beyond the project's community. It is most important to maintain the website up to date so that all important information are communicated to the target audiences. Therefore, all the information related to the last news of the project, events, workshops, publication and partners updates can be found on the website. Furthermore, through the website, every user can subscribe to the newsletter and receive the news as soon as it is published. The use of the website as a communication tool resulted to be effective, based on the statistics regarding the daily visits.



Figure 3. The OActive website

4.3.3 Social media

Different social media platforms should be used to communicate key messages to the audiences. Three main social media platform were, therefore, used for communication and dissemination purposes. Namely [LinkedIn](#), [Facebook](#) and [Twitter](#) act as tools to raise public awareness about the OActive project. All the profiles have been constantly updated with news, events, workshop, photos from meetings etc. Each platform has been used to reach a precise audience:

- OActive Facebook page is targeting to raise awareness to the wide public related to OA and the patient-specific solutions provided through OActive project.
- OActive LinkedIn page: is aiming to disseminate the project results in a business sense through creating a network of connections from the academia, health care sector, media, the general public, as well as possible investors and relevant stakeholders.
- OActive Twitter account: OActive followers will come from research organisations, universities related to ICT and medicine, and the general public.

During the course of the project, posts have been published on each social media, and this has resulted to a great engagement from the public that can be seen also from the website statistics.

Finally, a [YouTube account](#) was also created, hosting all the videos created or deriving from the project. Six (6) videos have been already uploaded throughout the project duration. YouTube is the most popular video platform on the planet, while videos are highly shareable. People upload more than 100 hours of video per minute to YouTube, making it one of the best ways to communicate to a wide audience

5 Identification of the effective dissemination strategy

5.1 What is dissemination and why it is important

According to the EC definition, dissemination is the public disclosure of the results by any appropriate means, including scientific publications. Dissemination activities contribute to:

- Transfer the knowledge and the results to whom can make the best of it
- Maximize the impact of the research, enabling the value of the results to be potentially wider than the original focus
- Avoid the results to be lost
- Strengthen the organizations' profile

Dissemination is only related to the results. The dissemination activities are aimed at reaching a specific audience (patients, care providers, hospital leadership, policymakers, etc.) that can use the results for further research activities or reaching industrial players who can assist in the commercialization of the invention.

A good dissemination strategy for a research project will help to increase awareness, maximizing the impact of the research improving the health outcomes of the patients that benefit from it. While scientific publications are useful to reach the academic community, a dissemination strategy that includes a detailed plan for stakeholder engagement, will give to the researcher the opportunity to have early feedback from experts in the field.

There are several instruments available for supporting the dissemination activities, such as newsletters, press release, brochures etc. During the project, five (5) Newsletters have been published. Since the dissemination is mainly related to the results, oral and poster presentations in conferences and dedicated workshops, scientific publications, as well as stakeholders events are activities that have to be included in the dissemination strategy.

5.2 Dissemination plan developed in OA project

The main goals of the OActive dissemination strategy are:

- To raise awareness about the objectives of the project, its results, its benefits, use and applicability
- To share experience on OA prevention, early diagnosis, prediction and treatment (data and knowledge) with relevant stakeholders
- To seek the support of the authorities, lobbies, policymakers and the general public
- To build understanding and facilitate the adoption of project results
- To assure that all interested parties are involved, participate and are informed about the status of the project.

5.3 Achievement and lesson learnt in the dissemination strategy

Dissemination material integrating the project identity and design needs to be prepared since the first results of the project become available. Attendance to events is encouraged in order technical partners to disseminate their results and their collaboration with other entities during the project. Conferences and Congresses are a great opportunity to widen their network and exchange opinions on their fields of expertise. Workshops and training sessions also offer unique opportunities to interested participants to gain knowledge on innovative solutions, technologies and ideas coming from an EU funded project.

The dissemination material of the OActive project can be found [HERE](#). Several events have been organized during the project, in particular, 2 workshops (one aiming to recruitments and one regarding the development of predictive models), 1 conference targeting to OA and 3 training activities (one targeting the end-users, one to the internal staff of the institutions taking part in the consortium and one regarding DMP). Other activities, such as the Innovation Radar, have been identified as important methodologies for dissemination purposes, as presented in the following sub-chapters.

5.3.1 Dissemination tools

The dissemination tools used in the OA project include:

- Press releases, newsletter and brochures

- Publications, including scientific publication of OActive results in peer-review journals
- Open Access Data Repositories
- Workshops training sessions and conferences; main aim here is to bring together groups of experts to discuss the project targets and applications
- Project website and social media technical news/posts
- Paid social media campaigns
- Dissemination videos
- Posters presenting the OActive results

5.3.2 Newsletters

Newsletters need to be developed in a 6--12 month basis. The importance of the newsletters' release is to inform the relevant audiences on the achievements of the project and all the advancements of work already performed. In some issues of the newsletters, it is advisable to include interviews from the members of the consortium, in others announce events, workshops or training, or even use the newsletters as means to present exploitation potentials and challenges.

Several newsletters have been developed during the project and some of them are summarized below:



Figure 4. The last 4 Issues of OActive newsletters

All newsletters can be found in the “Dissemination material” section of the OActive website.

5.3.3 Publications and Open Access Repositories

Several publications must be published in several peer-reviewed journals during the project. Scientific publications are an effective way to disseminate high-level project information and to attract the interest of representatives of the various target groups. By the end of the OActive project 20 journal articles were published.

To improve the visibility of the project partners are encouraged to use open access publication options. Platforms such as Research Gate and Zenodo can be used to upload scientific publications and act as monitoring tools of research work. In the case of Zenodo, data, presentations, as well as any other kind of dissemination material, can be found there. Research gate is increasingly used among the researchers, thanks to the open-access philosophy and the possibility to request directly to the author a full text of a paper or ask questions. The use of this kind of platform is highly recommended for dissemination purposes.

5.3.4 Technology watch section of the website

Technology Watch publications provide information on a variety of fields related with the project. This website section can be found [HERE](#) and it is designed to inform the scientific audience, and those in the wider community, in an accessible and easy manner.

In this section past publications deriving from the project consortium as well as popular science articles can be found.

5.3.5 Dissemination Events

Training and workshops

Several trainings and workshops were organized during the project. The main objective of the training sessions was to provide to key stakeholders (public and private) background knowledge and awareness on the technologies OActive is using, developing and supporting the prevention and early diagnosis, as well as the delay of progression of OA. The Workshops' target groups involved the representatives of the health sector (hospitals, doctors, health related associations), research organization and academia, OA patients, policymakers, stakeholders, investors as well as the general public).

The training activities were targeted to technology providers or end-users for elaborating the work performed and the possibilities, as well as internally to the consortium. The main objective of the Training seminars was to transfer the knowledge acquired under the OActive project to all interested groups aiming to highlight the benefits of the technologies involved and the processes, followed during the project, to the quality of life of the patients.

A first workshop was held aiming at patients recruitment at the beginning of the project. This can be considered as a suggested practice in case clinical trials are needed to be considered in similar projects. Moreover, a second workshop was organised towards the end of the project. In this workshop, OActive representatives and some cluster projects involved in the development of predictive models were invited to present their results. Representatives from the health sector, research organization and the general public attended the workshop which can be considered as a really important source of information and networking event. It is suggested to distribute the presentations deriving from the trainings and workshops for people that missed to attend the events in order to increase the audience even more.

DMP Training

During the project, AXIA developed an online training event in order to introduce the principles of FAIR data and open access publications in OActive. In addition, AXIA explained the definition of data and metadata and their utility in DMP. A list of action items was finally presented to partners in preparation for the DMP implementation. Following this training, partners seeking further guidance were assisted by AXIA on an individual basis.

Conference

A conference titled "From modelling to clinical predictive and interventional tools to treat Osteoarthritis" was organized on the 23rd of April 2021. The conference provided new insights, towards the adoption of multi-scale holistic analysis, where patient-specific information from various levels, including molecular (e.g. biochemical/inflammatory biomarkers), cell, tissue, and whole body, will be integrated and combined

with information from environmental, behavioural and social risk factors to generate robust predictors for new personalised interventions for delaying the onset and/or slowing down the progression of OA. The recordings of the conference are available online on [YouTube](#).

Clustering

Clustering activities were at the focus of the project as CETRI, the partner responsible for clustering activities, and AXIA, leading Dissemination and Communication, were in communication throughout the project with several EU initiatives, including RAINDOW, In-Silc, Metajoint, EU-Stands4PM, and Precise4Q among others. Overall 11 projects were invited during the course of the project's events. Presentations from different initiative that were presented during such events can be found on the OActive website.

5.3.6 Cordis wire

All projects from their beginning are included in this EC platform, where by typing the project title one can find information including project summary, results, periodic reports etc. <https://cordis.europa.eu/project/id/777159>

In OActive, the Cordis Wire platform was used to promote events and communicate important information related to the project. This platform was used during the project to increase the visibility of the OActive project since it allowed to reach a wider audience².

Cordis was used to promote the “Personalised Predictive Models” workshop, as well as the final conference “From Modelling to Clinical predictive and interventional tools to treat osteoarthritis”. A dedicated post was published each time on the platform, where the event's content was explained together with a link for the registration.

Cordis wire platform was also used to present a manual on “How to implement ethics and data protection requirements in an EU- funded research and innovation action” that was prepared in the framework of the project³. The aim of the manual was to present a list of actions that help to compile with general ethics, data protection and safety requirements in EU-funded projects. The publication of such information in the Cordis platform helped to communicate effectively such an important topic.

5.3.7 Paid campaigns

Social media advertising spend is expected to top \$47.9 billion in 2021⁴. That's because social media has become the go-to place for audiences from research and purchase products. Ultimately, paid social media helps with targeting audiences just as organic social media does. Among the advantages of a paid campaign is the number of people that will see your post, whereas not guaranteed in some cases audience can be specified based on region, social aspects or frequently experience or job position. On the contrary, unpaid post is uncertain by WHO will be seen: while some of the content might score tons of engagement,

² <https://cordis.europa.eu/article/id/429343-oactive-h2020-project-is-organising-a-workshop-on-march-26th-10-00-12-00-cc>

³ <https://cordis.europa.eu/article/id/429592-how-to-implement-ethics-and-data-protection-requirements-in-an-eu-funded-research-and-innovation>

⁴ <https://blog.hubspot.com/marketing/paid-social-media>

other posts might feel like they're totally hidden. During OActive a paid campaign was made aiming to the promotion of the OActive workshop.

5.3.8 Innovation Radar

The Innovation radar is an initiative introduced by the EC, that aims at identifying innovators and innovations with high potential within EU-funded research and innovation projects. The innovators that decide to apply for the Innovation Radar, are characterized on the basis of specific indicators related to the market maturity and disruptive potential. After this step, the Innovation Radar supports the innovators by offering advice and support them in the next steps. Another aspect of the Innovation Radar is to illustrate the results of the EU-funded project to the citizens.

Moreover every year, innovators can participate in the Innovation Radar Prize competition for EU-funded innovators. In this competition, a shortlisted group of high potential innovations are identified every year and the corresponding innovators are invited to pitch their innovative results to a panel of experts, investors and entrepreneurs. Of course, participation in this final phase of the Innovation Radar Prize can be a strong selling point by any organization promoting their innovative results/products/methods etc.

In this regard, University of Patra, partner of the OActive project, was one of the finalists of the Innovation Radar Prize 2019 in the category "Tech of Society". The University of Patras reached the finalists for the innovative methodology developed for Osteoarthritis prevention in the framework of OActive project⁵.

⁵ <https://www.oactive.eu/university-of-patras-finalist-in-the-category-tech-of-society-for-the-innovation-radar-prize-2019>

The following graph summarized the lessons learnt deriving from this chapter:

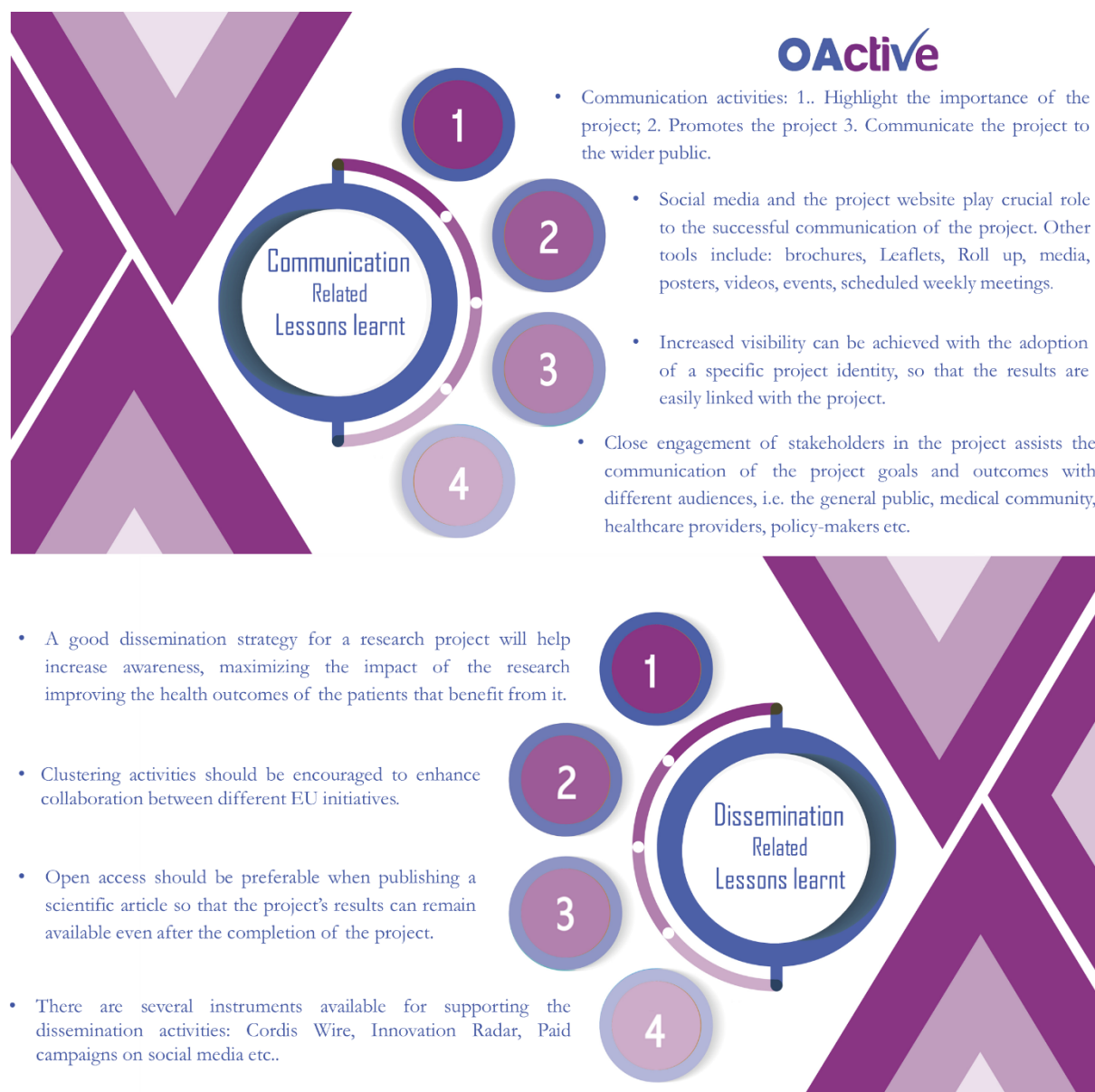


Figure 5. Dissemination and Communication lessons learnt

6 Exploitation strategy: lesson learnt and main outcomes

The best practices and lessons learnt for the process of developing the OActive Exploitation Strategy relate to the level and nature of support that all project partners need in order to fully capture the concept and importance of “Exploitation” within EU funded projects. On this matter, we identified the following critical lessons:

First of all, all technical partners should be exposed to the necessity of developing a robust Exploitation Strategy, early on. Technical partners may not even be very familiar with the term “exploitation” and, thus, not able to comprehend why all exploitation related tasks are crucial for the sustainability and replicability of their project results. By recognizing the importance of developing an individual exploitation strategy,

technical partners become more elaborate on IP issues and on how to protect their results, engage more in dissemination activities (events, publications, etc.) and express interest in clustering with other projects in similar fields.

Moreover, all technical partners should realize that the exploitation of their results can be commercial and non-commercial, but also societal, political, or for improving public knowledge and action. It should be clearly explained that by exploitation we mean the utilization of the results in further research activities, in standardization activities, or in developing, creating and marketing a product, process or service. Therefore, there is a variety of exploitation routes available, such as: Spin-offs/Start-ups, Developing and selling products and services, Contribution to Standards, Patent, PhD thesis, Societal activity, Open licenses, Further research, New projects, Policy recommendations, Expanded networks, etc. In this way, all partners realize that the selection of the Exploitation route depends on the nature of the result, the nature of the entity that produced the result, the commitment needed in terms of time, resources, even passion, the appetite for risk, and of course on the potential benefits in monetary or other form. As a result, all participant beneficiaries increase their chances in selecting the best and more adequate exploitation strategy for their individual results.

Furthermore, it is important that all project partners are familiar with the options they have in collaborating after the end of the OActive project, in order to bring OActive at TRL9 and eventually place it in the market. There are several ways to jointly commercialize the OActive Integrated System in a reasonable time frame after the conclusion of all project related activities. It was important to engage with the partners and elicit their interest and willingness in co-working on OActive in some form of a new entity, such as a Joint Venture or under a Collaborative Agreement.

In order to address the points above, CETRI engaged in the following actions.

- Developed an Exploitation Strategy Manual (Annex 1) to ensure that all project partners had a step-by-step guide to follow in order to identify their results and report on their individual exploitation plans.
- Reserved time at consortium meetings dedicated to Exploitation, where the course of action was explained and questions were addressed.
- Engaged in one-to-one support with all project partners in order to assist them in shaping their Exploitation Strategies

To better serve the purpose of after-project exploitation activities, TIMELEX developed an “OActive – Letter of Intent relating to the continued support of the outcomes of the OActive project after its termination” (Annex 2).

Both CETRI and TIMELEX identify the above activities as worth replicating and adapting accordingly to future EU funded projects to really accelerate the exploitation of project results and facilitate all project partners in reaching their full potential in terms of attracting talent, growing and networking, while on the same time boosting the overall innovation capacity in EU.

The following figure summarises some of the exploitation related lessons learnt.

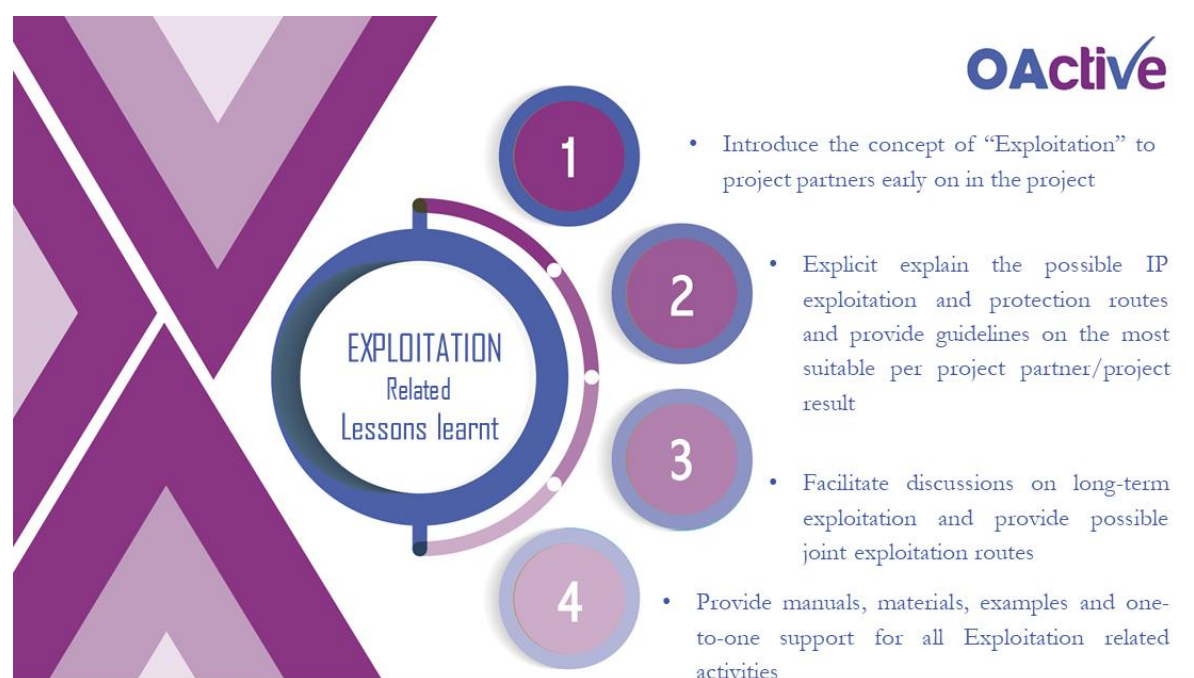


Figure 6. Exploitation related lessons learnt

7 Conclusion

This report is a result of the knowledge gained throughout the project, as identified by the technical partners and the entities responsible for the Dissemination, Communication and Exploitation Activities of the project.

The report includes a detailed presentation of the lessons learnt focusing on osteoarthritis prevention and treatment as well as general guidelines on successful Communication and Dissemination practices, as well as suggested pathways for more efficient implementation of the exploitation strategy.

Annex 1



EXPLOITATION STRATEGY MANUAL

Table of contents

1	Exploitation Strategy Manual - Introduction	3
2	IP Registry	1
2.1	IP Registry Template for your own Results	2
2.2	IP Registry for the UPAT Results	Error! Bookmark not defined.
3	Market Analysis	3
3.1	Market Analysis for the OActive Integrated System	3
4	Competition analysis	3
4.1	Competition analysis for the OActive Integrated System	3
5	SWOT Analysis	4
5.1	SWOT Analysis template for your own OActive Product/Service	7
5.2	SWOT Analysis template for the OActive Integrated System	Error! Bookmark not defined.
6	PORTER's FIVE FORCES ANALYSIS	4
6.1	PORTER's FIVE FORCES ANALYSIS template for your own OActive Product/Service	5
6.2	PORTER's FIVE FORCES ANALYSIS for the OActive Integrated System	Error! Bookmark not defined.
7	Business Model Canvas	8
7.1	Business Model Canvas Template for your own OActive Product/Service	1
7.2	Business Model Canvas Template for the OActive Integrated System	Error! Bookmark not defined.
8	Future Funding Sources	1
8.1	Future Funding Sources for the OActive Integrated System	Error! Bookmark not defined.
9	Feedback	1
9.1	Feedback from end-users	1

9.2 Feedback from industrial stakeholders 1

1 Exploitation Strategy Manual - Introduction

The purpose of this document is to support all partners in building their **exploitation strategies for their OActive Results/Products/Services**. IP, market & business-related analyses/tools comprise the exploitation strategy. We present all these analyses in the following structure:

- Theory
- Template (if needed)
- Example (most examples are made for the integrated OActive framework, except for the IP Registry example)

STEPS:

1. We need to update the [IP Registry](#) of Deliverable 1.4 with the **final OActive Results***.

According to article 26.1 of the Grant Agreement: “Results” means any (tangible or intangible) output of the action such as data, knowledge or information — whatever its form or nature, whether it can be protected or not — that is generated in the action, as well as any rights attached to it, including intellectual property rights. The Grant Agreement also establishes that the results of the project are owned by the participant generating them.

We need to identify the **short/medium term and medium/long-term exploitable Results and the respective Products/Services***. According to the Review report:

- Short/medium term: Multiscale Mechanistic Models, AR gaming
- Long-term: Studies on the biomarkers, behavioral models and the Integrated Hyper-modelling Framework

**All project Results combined form the OActive Integrated system. One Result may form one stand-alone Product/ Service. Multiple Results -owned by one or more partners- can form one stand-alone Product/ Service. Certain Results may not be integrated into Products/ Services other than the OActive Integrated system.*

2. For the **Exploitation Strategy** of each Result/Product/Service we have to conduct the following **analyses**:

➤ **Short/medium term exploitation:**

- [Market Analysis](#) (1-2 pages max)
- [Competition analysis](#) (in the market and in scientific publications) (1-2 pages max)

- [Porter's Five Forces analysis](#) (in Table format)
- [SWOT analysis](#) (in Table format)
- [Business model canvas](#) (in Table format)
- [Future funding sources](#) (1 paragraph is OK)

➤ **Long term exploitation:**

- [Market Analysis](#) (1-2 pages max)
- [Competition analysis](#) (in the market and in scientific publications) (1-2 pages max)
- [Future funding sources](#) (1 paragraph is OK)

➤ **If no Product or Service stems out of your work within OActive, then you need to document the following for your Results:**

- State-of-the -art in the literature (Parallel R&D activities concentrating their efforts towards the same direction as your organization's project results. You may refer to published papers, research centers, Universities' research groups, companies' R&D departments, etc.) (1-2 pages max)
- Areas -within OA management and beyond- in which your work could be applicable in the future (after further research). (1-2 pages max)
- Products/Services that could stem out of your work in OA Management and beyond. (1 page max)

3. We have to engage with **end users and industrial stakeholders** (especially SMEs) to get **feedback on OActive's Results**.

2 IP Registry

We need to update the IP Registry of Deliverable 1.4 by providing the following information for each Result that has been developed during the course of the OActive project:

- A meaningful title
- A comprehensive short Description
- The relation to the work structure: Work Package, Task, Deliverable
- The Background IP -if any-, meaning the pre-existing IP, know-how, knowledge or any additional data that is needed for carrying out the project
- The names of the partner(s)/beneficiaries with whom the Result may have been co-developed
- The shares of ownership per partner/beneficiary
- The nature of work per partner/beneficiary
- The preferred IP protection route
- The preferred exploitation routes
- The Technology Readiness Level (TRL) – if applicable

2.1 IP Registry Template for your own Results

Results Information					Results' Ownership and Exploitation						
No:	Title:	Description	Relation to the work structure (Task, Deliverable)	Relevant Background knowledge & IP that will be used in the development of the Result	Beneficiary Name & Share of IP rights (%)	Nature of Involvement	Preferred protection route	Technology Readiness Level (TRL) & Short/medium term OR Long-term Exploitation	Exploitation as a component of the OActive Integrated System via a Joint Venture or Collaborative Agreement (YES/NO)	<div>Independent Commercial Exploitation</div> <div>-----</div> <div>Stand - alone PRODUCT/SERVICE and/or PRODUCT/SERVICE formed in combination with other Results in the area of OA management and beyond (YES/NO, other Result(s), Product(s))</div>	Further scientific research (YES/NO, areas in OA and beyond)
					Partner A						
					Partner B						

For examples please refer to Deliverable D1.6.

3 Market Analysis

To conduct a market analysis, you should answer the following questions:

- What is the market for your product?
- What are the growth rates, and the barriers and drivers for growth in this market?
- Which are the biggest market players?
- Which region (Europe, Asia, etc.) shows the biggest expansion in your market?
- Which are the target markets for your products? (Who would be interested in buying your product?)
- Are there any EU SMEs which would be interested in buying your product or in co-investing/partnering with you to achieve higher TRLs and commercialize your product?
- What are other areas within OA management or for the management of other diseases that your product could be used? Which are the new products (and the new target markets) that may emerge in the future by further developing your product?

3.1 Market Analysis for the OActive Integrated System

Please refer to Deliverable D10.5.

4 Competition analysis

To conduct a competition analysis, you should answer the following questions:

- Who is the competition in your market? (for low TRLs: State of the art in the literature and emerging/niche/new products that can act as substitutes to your product)
- How does your product differentiate from the all other available/upcoming solutions? What makes your product unique and attractive?

4.1 Competition analysis for the OActive Integrated System

Please refer to Deliverable D10.5.

5 PORTER'S FIVE FORCES ANALYSIS

The Porter's Five Forces analysis is a qualitative method for assessing how an industry/company/product should be positioned in the market for maximum success. First described by Michael Porter in his classic 1979 Harvard Business Review article, this theory is based on the concept that there are five forces that determine the competitive intensity and attractiveness of a market^{6,7}:

1. **Competition in the Industry.** The main driver is the number and capability of competitors in the market. Many competitors, offering undifferentiated products and services, will reduce market attractiveness.
2. **Potential of New Entrants into an Industry.** Profitable markets attract new entrants, which erodes profitability. Unless incumbents have strong and durable barriers to entry, for example, patents, economies of scale, capital requirements or government policies, then profitability will decline to a competitive rate.
3. **Power of Suppliers.** An assessment of how easy it is for suppliers to drive up prices. This is driven by the: number of suppliers of each essential input; uniqueness of their product or service; relative size and strength of the supplier; and cost of switching from one supplier to another.
4. **Power of Customers.** An assessment of how easy it is for buyers to drive prices down. This is driven by the: number of buyers in the market; importance of each individual buyer to the organisation; and cost to the buyer of switching from one supplier to another. If a business has just a few powerful buyers, they are often able to dictate terms.
5. **Threat of Substitutes.** Where close substitute products exist in a market, it increases the likelihood of customers switching to alternatives in response to price increases. This reduces both the power of suppliers and the attractiveness of the market.

For each one of the “Forces” you should indicate Low/Medium/High and also provide a short justification for your selection. For example: For the first “Force”: Competition in the industry, your answer could be: High-because lately more companies that deliver products that are similar to or can substitute the OActive mechanistic model are emerging.

⁶ CGMA, 2013, [Porter's Five Forces of Competitive Position Analysis](#), Online article

⁷ Institute for Strategy & Competitiveness, Harvard Business School, [The Five Forces](#), Online article

5.1 PORTER's FIVE FORCES ANALYSIS template for your own OActive Product/Service

RESULTS TABLE		PORTER's FIVE FORCES ANALYSIS				
No	Title:	Competition in the Industry	Potential of New Entrants into an Industry	Power of Suppliers	Power of Customers	Threat of Substitutes
1						

For examples please refer to Deliverable D10.5.

6 SWOT Analysis

SWOT stands for Strengths, Weaknesses, Opportunities, and Threats. The SWOT analysis is the identification of the internal (Strengths and Weaknesses) and external (Opportunities and Threats) helpful and harmful factors that could have an impact in the exploitation of the OActive Results/Products.

In more detail, we need to identify⁸:

- Strengths: Characteristics of the result/product that give it an advantage over others.
- Weaknesses: Characteristics of the result/product that place it at a disadvantage relative to others.
- Opportunities: Elements in the environment that the result/product could exploit to its advantage.
- Threats: Elements in the environment that could cause trouble for the result/product.

It is obvious that the Strengths and Weaknesses are things that partners have some control over and can change (for example: team members, intellectual property, location), while the Opportunities and Threats (for example: competitors, prices of raw materials, etc.) are taking place on outside of the project, in the larger market. The partners can take advantage of opportunities and protect against threats.

⁸ Mitchell Grant, Updated Oct 9, 2019, [Strength, Weakness, Opportunity, and Threat \(SWOT\) Analysis](#), Online article

6.1 SWOT Analysis template for your own OActive Product/Service

RESULTS TABLE		SWOT ANALYSIS			
No	Title:	Strength Points	Weak Points	Opportunities	Threats
1					

For examples please refer to Deliverable D10.5.

7 Business Model Canvas

The **Business Model Canvas** is a strategic management tool for developing new or documenting existing business models. It's a one-page document containing nine boxes that represent different fundamental elements of a business: 1. value propositions, 2. customer segments, 3. channels, 4. customer relationships, 5. revenue streams, 6. key resources, 7. key partners, 8. key activities, and 9. cost structure.

Filling a business model canvas can take **between 15 and 30 minutes**, and it is advisable to populate the template in the numerical order specified above. In the following page (BUSINESS MODEL CANVAS explained), you may see the structure of a typical Business Model Canvas, accompanied by detailed info on what type of content corresponds to each one of the aforementioned building blocks.

Your answers can be qualitative only (no need for quantitatively assessing costs and revenues.)

For examples please refer to Deliverable D10.5.

BUSINESS MODEL CANVAS explained

1. Value propositions

SC1-PM-17-2017

This is the building block that is at the heart of the business model canvas. And it represents your unique solution (product or service) for a problem faced by a customer segment, or that creates value for the customer segment.

A value proposition should be unique or should be different from that of your competitors. If you are offering a new product, it should be innovative and disruptive. And if you are offering a product that already exists in the market, it should stand out with new features and attributes.

Value propositions can be either quantitative (price and speed of service) or qualitative (customer experience or design).

2. Customer Segments

Customer Segments: These are the groups of people or companies that you are trying to target and sell your product or service to.

8. Key Partners

Key partners are the external companies or suppliers that will help you carry out your key activities. These partnerships are forged in order to reduce risks and acquire resources. Types of partnerships are:

- **Strategic alliance:** partnership between non-competitors
- **Coopetition:** strategic partnership between partners
- **Joint ventures:** partners developing a new business
- **Buyer-supplier relationships:** ensure reliable supplies

7. Key Resources

This is where you list down which key resources or the main inputs you need to carry out your key activities in order to create your value proposition. There are several types of key resources and they are

- **Human (employees)**
- **Financial (cash, lines of credit, etc.)**
- **Intellectual (brand, patents, IP, copyright)**
- **Physical (equipment, inventory, buildings)**

6. Key Activities

What are the activities/ tasks that need to be completed to fulfil your business purpose? In this section, you should list down all the key activities you need to do to make your business model work. These key activities should focus on fulfilling its value proposition, reaching customer segments and maintaining customer relationships, and generating revenue. There are 3 categories of key activities;

- **Production:** designing, manufacturing and delivering a product in significant quantities and/ or of superior quality.
- **Problem-solving:** finding new solutions to individual problems faced by customers.

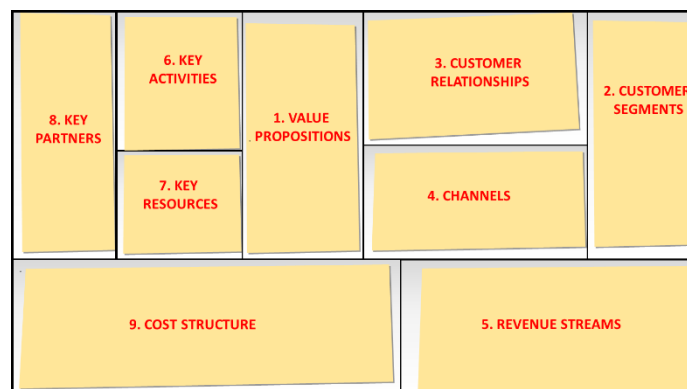
9. Cost structure

In this block, you identify what are the major costs incurred by your business. You'll need to focus on evaluating the cost of creating and delivering your value propositions, creating revenue streams, and maintaining customer relationships. And this will be easier to do so once you have defined your key resources, activities, and partners.

4. Channels

This block is to describe how your company will communicate with and reach out to your customers. Channels are the touchpoints that let your customers connect with your company. Channels play a role in raising awareness of your product or service among customers and delivering your value propositions to them. Channels can also be used to allow customers the avenue to buy products or services and offer post-purchase support. There are two types of channels

- **Owned channels:** company website, social media sites, in-house sales, etc.
- **Partner channels:** partner-owned websites, wholesale distribution, retail, etc.



3. Customer Relationships

The Customer Relationships building block answers the question of how you get, keep, and grow customers. There are several types of customer relationships:

- **Personal assistance:** you interact with the customer in person or by email, through phone call or other means.
- **Dedicated personal assistance:** you assign a dedicated customer representative to an individual customer.
- **Self-service:** here you maintain no relationship with the customer, but provides what the customer needs to help themselves.
- **Automated services:** this includes automated processes or machinery that helps customers perform services themselves.
- **Communities:** these include online communities where customers can help each other solve their own problems with regard to the product or service.
- **Co-creation:** the company allows the customer to get involved in the designing or development of the product (for example, YouTube)

5. Revenue Streams

Revenues streams are the sources from which a company generates money by selling their product or service to the customers. And in this block, you should describe how you will earn revenue from your value propositions. A revenue stream can belong to one of the following revenue models:

- **Transaction-based revenue:** made from customers who make a one-time payment
- **Recurring revenue:** made from ongoing payments for continuing services or post-sale services

There are several ways you can generate revenue from:

- **Asset sales:** by selling the rights of ownership for a product to a buyer
- **Usage fee:** by charging the customer for the use of its product or service
- **Subscription fee:** by charging the customer for using its product regularly and consistently
- **Lending/ leasing/ renting:** the customer pays to get exclusive rights to use an asset for a fixed period of time
- **Licensing:** customer pays to get permission to use the company's intellectual property
- **Brokerage fees:** revenue generated by acting as an intermediary between two or more parties
- **Advertising:** by charging the customer to advertise a product, service or brand using company platforms

7.1 Business Model Canvas Template for your own OActive Product/Service

Partner ...

Result ...

Key Partners	Key Activities	Value Propositions	Customer Relationships	Customer Segments
	Key Resources		Channels	
Cost Structure			Revenue Streams	

8 Future Funding Sources

We need to specify how we are going to finance the further development of our project Results/Products/Services, to bring them at TRL9 and to achieve successful integration of all components. One paragraph per project result is OK.

For examples please refer to Deliverable D10.5.

9 Feedback

According to the Review Report we need to engage with end users and industrial stakeholders (especially SMEs) to get feedback on OActive's Results.

9.1 Feedback from end-users

Feedback from clinicians & patients is needed in order to understand to what extent the level of OActive's performance obtained represents a relevant aid in real-world clinical scenarios. Feedback can be obtained via:

- the networks of Ri.MED, HULAFE, ANIMUS
- the invited speakers at the Workshop and the Final Conference (maybe via Questionnaires)

9.2 Feedback from industrial stakeholders

Feedback from industrial stakeholders is needed, especially from SMEs in the area of digital health. Feedback can be obtained via:

- communication of our results to our industrial stakeholder network (Applicable for SMEs in the consortium)
- the invited speakers at the Workshop and the Final Conference (maybe via Questionnaires)

Annex 2

OActive – Letter of Intent relating to the continued support of the outcomes of the OActive project after its termination

Undertaken by:

[name, legal form, official address, VAT/Tax Code], hereafter the 'Party',

Herein validly represented by [name], in his/her legal capacity as [function],

Having regard to the following:

- The Party participated as a partner in the OActive project (hereafter 'OActive', a project that has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 777159, to which the Party was a signatory;
- In the opinion of the Party, OActive has successfully produced various project outcomes which have clear market and business potential, and which can be further promoted / developed / exploited beyond OActive's date of termination as set out in accordance with the Grant Agreement;
- Based on this opinion, the Party is willing and intends to provide further support as described in this Letter of Intent to the promotion, development, and exploitation of OActive outcomes.

Therefore, the Party declares as follows:

Intent of the Party

- The Party shall make available commercially reasonable resources, in accordance with OActive's market and business potential as assessed by the Party, in order to support the promotion, development and exploitation of OActive outcomes, notably by:
 - [describe your commitments, preferably broken up into bullet points. Short & to the point is better]
 - [add as many bullet points as needed]
- The Party shall continue to engage in good faith discussions and interactions with any other OActive partners who have provided a comparable letter of intent and shall work with them constructively and proactively in order to seek out and identify joint business opportunities wherever this is necessary and beneficial to the Party to realise OActive's market and business potential.

For the avoidance of doubt, this Letter of Intent is limited to what is stated explicitly herein. This Letter of Intent does not create any legal undertaking, consortium, formal partnership or joint venture, nor does it result in any agency or grant any power of representation to any party. This Letter of Intent does not give rise to any transfers of property rights (including intellectual property rights), nor to any grants of licences or permissions, and it does not replace or affect in any way any legal agreements to which the Party is a signatory. This Letter of Intent does not grant any exclusivity rights and does not constitute an obligation to ensure the involvement of other parties before acting on any business or market opportunity in relation to OActive.

Duration and validity of this Letter of Intent

The Party shall make adequate resources available in order to make good on its intent as described above after the date of termination of OActive, and it shall act in accordance with this Letter of Intent, for a period of time which it deems to be useful in order to conclusively determine OActive's market and business potential to its own satisfaction.

Without formal commitment on this exact duration, the Party's best efforts estimation of this period of time is presently a period of two years after the signing of this Letter of Intent.

This letter of intent is a good faith statement of commitment on the Party, but does not give rise to a binding legal obligation in the absence of further agreements in relation to specific business or market opportunities.

Applicable law and disputes

This Letter of Intent, including its interpretation and legal enforceability, shall be subject to the laws of the country of establishment of the Party, and the competent courts shall be those of the country of establishment of the Part.

Signed on [date], in [location], by [same name as above]

[Signature and/or company stamp]