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CREXDATA

Critical Action Planning over Extreme-Scale Data

D6.3 Final Report on the Dissemination, Exploitation and Business Plan

Version 1.0

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Executive Summary

Deliverable D6.3 “Final Report on the Dissemination, Exploitation and Business Plan” reports on communication, dissemination, exploitation and cohesion activities carried out from 1 January 2023 to 31 December 2025 (M1-M36), with a particular focus on the last reporting period (M19-M36). These activities were implemented within the framework of WP6 and aimed to ensure that the innovative solutions developed within CREXDATA extend beyond the laboratory to achieve long-term sustainability and impact. This report includes a comprehensive overview of the work carried out within the three tasks in this WP, namely, achievements in dissemination activities (T6.1), a framework for a joint business model and robust business plan as part of innovation management, exploitation and business planning (T6.2), and strategic synergies with the AI, Data and Robotics Association, civil protection organizations and AIonDemand platform as part of the cohesion activities (T6.3).

Dissemination highlights include a doubling of website users since M18 (from 1,500 active users at M18 to 3,800 at M36), a large increase in publications in journals and conference proceedings (57 in total, up from 27 at M18), high participation in third party events (49 since M19 and 71 participations in total), and high engagement in the main social media channel (LinkedIn).

Innovation, exploitation and business planning activities focused on translating the project's technological advances into sustainable solutions. Throughout the project, these activities ensure that the technologies delivered added value, meet clearly defined market needs and align with long-term strategic opportunities. The work included the systematic identification of innovation potential, the validation of value propositions for various stakeholders, and the evaluation of relevant areas of application. A comprehensive exploitation strategy was developed to guide the effective introduction and long-term adoption of the project results. This strategy was supported by a robust business plan that details operational and strategic considerations and ensures the feasibility and scalability of future implementations. In addition, tailored business models were developed that reflect different use cases, partners and market requirements and form the basis for exploitation and a lasting impact beyond the project duration. Overall, these activities ensure a clear path from research and development to practical application and ensure that the project's innovations deliver lasting value to industry, public authorities and society as a whole. Key CREXDATA innovations are:

- Federated Learning under bandwidth constraints
- A platform for epidemic simulations
- Complex Event Recognition with Symbolic Register Transducers
- Augmented Reality toolkit for critical action (flood, fire, maritime) environments
- Multi-Modal Data Fusion Toolbox
- Edge-To-Cloud extension for graphically specifying streaming workflows over edge to cloud settings
- Optimizer for edge to cloud Processing

Cohesion activities were successfully implemented by aligning them with the overall objectives of the project, partner-specific priorities and the operational requirements of the defined use cases. These activities ensured a high degree of coordination, consistency and interoperability across all technological, methodological and organisational areas of work. This coordination not only improved the quality and robustness of the project results but also strengthened joint innovation among the 16 partners. Ultimately, the cohesion activities played a crucial role in ensuring that the project progressed in a coordinated manner, delivered interoperable solutions, and maintained strategic consistency from the early research phases through to final implementation.

1 Introduction

In the highly dynamic and innovation-oriented environment of the European Union, technological progress is a key driver of competitiveness and sustainable development. Our EU project, carried out in collaboration with 16 consortium partners, focuses on the development of groundbreaking technologies that offer significant added value and have a transformative impact on science, society and various sectors. To ensure that these innovations go beyond the research phase and are successfully brought to market, it is essential to draw up a comprehensive dissemination, exploitation and business plan.

1.1 Purpose of this Document

The final version presented here comprises several key components: identifying and formulating the potential value generated by applying CREXDATA technologies and concepts, developing a robust, sustainable and future-proof business plan and corresponding business model, and formulating a detailed strategic framework. Together, these elements are crucial to accompanying the transition from technological innovations to ready-to-use, market-ready solutions and laying the foundation for long-term success. With this systematic and integrated approach, we aim to ensure that the technologies developed within the EU project are not only innovative but also offer tangible and measurable benefits for the society and economy of the European Union.

1.2 Relation to other Project Documents

[GA] Grant Agreement (no. 101092749) with its

[DoA] Description of Actions (DoA, part of the [GA])

[CA] Consortium Agreement

[D1.1] Deliverable D1.1 Quality Assurance Plan

[D1.2] Deliverable D1.2 Data Management Plan

[D1.3] Deliverable D1.3 Ethics Manual

[D6.1] Plan for Dissemination and Exploitation, Project Presentation and Website

[D6.2] Initial Report on Dissemination, Exploitation and Business Plan

1.3 Contribution and Structure of this Document

First, we systematically analysed the newly created values, clearly defining the potential of the developed technologies and validating their relevance for different market segments. Building on this, we successfully implemented a comprehensive exploitation strategy that outlined clear measures and paths for effectively introducing the technologies to the market and establishing them on a sustainable basis. A well-founded business plan supported this strategy by detailing financial, operational and strategic aspects and creating the basis for decisions on implementation. Finally, tailor-made business models were developed and piloted, taking into account the diverse application scenarios and market requirements and thus ensuring the long-term sustainability, scalability and competitiveness of the technologies.

1.4 Target Audience

- CREXDATA technology partners ("developers")
  - bringing in Core Competences
  - creating Key Exploitable Results
  - targeting exploitation in a range from scientific to commercial ambitions
- CREXDATA use case partners
  - end users
  - end user representatives and domain multipliers
  - partners providing background in terms of demonstrator components
- Third party adopters in application-oriented research domains, especially
  - security
  - health
  - maritime
  - additional innovation fields like Smart Factory, Smart Grid etc.

1.5 Glossary

Table 1: Glossary of D6.3

Abbre-viation	Expression	Explanation
BP	*Business Plan*	A BP is a document that details an institution's goals, strategies, market analyses, financial projections and operational plans and serves as a guide for start-up and growth.
BM	*Business Model*	A BM describes the way an organisation creates, delivers, and captures value by outlining the fundamental aspects of its business, revenue streams and cost structures.
IF	*Innovation Field*	An IF refers to a specific area or market in which a institution identifies and pursues opportunities to develop new products, services or processes through new technologies.
MTr	*Mega Trend*	A MTr is a comprehensive, long-term change in society, the economy, technology or the environment that has a profound impact on various areas of life and work.
CorC	*Core Competence*	A CoreC is a unique ability or specialised knowledge of an institution that gives it a competitive advantage and is difficult for competitors to imitate.
KER	*Key Exploitable Result*	A KER is a significant result or a realisable innovation from a project or research that has the potential to be exploited or further developed.

2 Communication and dissemination strategy

The communication and dissemination strategy of CREXDATA was established early in the project by the task leader, Barcelona Supercomputing Center (BSC). The strategy was continuously maintained regarding (a) the production of promotional materials used to communicate the project's vision and benefit and disseminate its results; (b) the development of a website that will operate as the entry point for those interested parties that wish to become aware of the proposed solutions as well as update on the latest research project results; (c) organizing and participating in scientific/industrial workshops; (d) publishing technical and methodological results, as well as participating in major conferences; (e) providing guidance to transform research efforts into business value to target groups of the CREXDATA solution; and (f) emphasizing the advantages of the achievements over the existing solutions. Throughout this report we will analyse each of these activities and how they fit in the communication and dissemination strategy that has allowed us to:

- Increase the project's visibility by generating interest around the CREXDATA network.
- Consolidate a community of users interested in project updates and the publication of scientific results.
- Exchange knowledge through meetings, conferences, and the organization of events.
- Promote media coverage and dissemination of the CREXDATA solution in news outlets, blogs, and specialized portals or accounts.
- Share the project's results and progress with the scientific community and the specialized press.
- Promote collaboration with other stakeholders in the sector and forge alliances through events or other initiatives.

2.1 Project identity, materials and press strategy

2.1.1 Corporate image

The project branding and identity were established in the report *D6.1 Plan for Dissemination and Exploitation, Project Presentation and Website*, which defined the logo, fonts, colours, language and templates.

Figure 1: Branding KPI tracking

PowerPoint, Word, and poster templates featuring the project's corporate image were provided to the entire consortium through the shared repository. These templates were available since the project's inception, ensuring a consistent graphic style and guaranteeing that all materials included EU funding acknowledgments.

These materials were used consistently by the entire consortium throughout the project's duration.

The development and availability of these materials marked one of the first achievements of WP6. Notably, the project logo, in all its versions and variants, can be downloaded from the 'Branding' page on the project website.

2.1.2 Communication and dissemination materials

Figure 2: Disseminational material KPI tracking

Following the guidelines outlined in *D6.1 Plan for Dissemination and Exploitation, Project Presentation and Website*, and in fulfilment of the activity *(*a) Production of promotional material that will be used to disseminate the CREXDATA concept, results and benefits, various materials were developed to promote CREXDATA to different target audiences. In *D6.2 Initial Report on the Dissemination, Exploitation and Business Plan* several communication materials were already produced, including the promotional flyer and the Zoom background. These materials were updated and expanded to include additional flyers, roll-up, poster, and project videos. This section provides additional details related to these materials.

Promotional flyer

A total of three different flyers were created to generate interest in the project through distribution at various events and conferences. An initial overall project flyer was detailed in D6.1 and D6.2, explaining the CREXDATA platform and its solutions. Simultaneously, a flyer detailing the case studies was also produced. During this last reporting period, an additional flyer was created with more detail on the platform and the results achieved by each use case. All three flyers were distributed during events and shared digitally. Most recently, these flyers were made available to attendees at the European Big Data Value Forum (EBDVF) 2025, where CREXDATA had a booth. It is worth noting that all three versions of the flyers are available for viewing and download on the project website (on 'Branding' page).

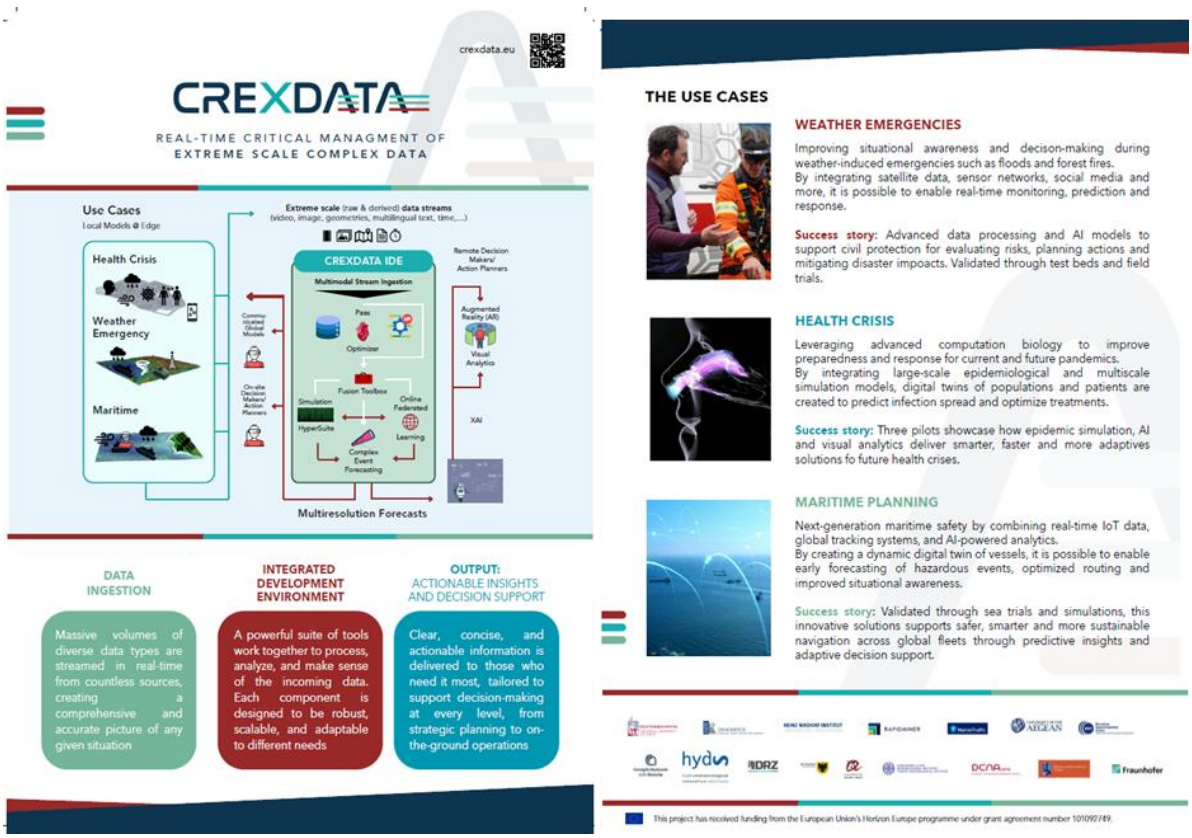

Figure 3: CREXDATA final flyer (both sides)

Roll-up

Another material developed for the promotion and dissemination of the project is roll-up. Like the other materials produced, the roll-up banner design adheres to the project's corporate image and has been used at various events and conferences, proving to be a highly visual element. The roll-up banner is intended to convey the project's basic information while also serving as an identifier in stands and in booths at fairs and other events.

Figure 4: Deniz Öczan (UPB), Janine Gehrig (UPB) and Dr.-Ing. Jens Pottebaum (UPB) in front of the CREXDATA booth at EBDVF 2025

Posters and presentation

A project overview poster was created to help partners easily share information about the project. This poster was presented during 'Nit de la Recerca' 2023, an event focused on citizen engagement, where the primary target audience was the general public. This poster is available for download on the project website (on the 'Branding' page). In addition, three more scientific posters were presented: "Situation Visualization, Action Planning and Decision Support: Making Extreme Data Usable" presented at the 2024 Annual Conference of the Association of the German Fire Service (vfdb), which was awarded best poster; and "A Digital Twin of COVID-19 Infected Lungs Allows for Personalized, Interactive Clinical Interventions," presented at the 2025 International Conference on Systems Biology (ICSB), and "DAG*: A Novel A*-alike Algorithm for Optimal Workflow Execution across IoT Platforms", presented at the IEEE International Conference on Data Engineering (ICDE). The vfdb poster was subsequently presented at the Innovation and Technology Expo during the 2025 trade fair and conference of the Dutch fire services, called "Brandweerevent". A CREXDATA rollup was also displayed at the DRZ stand during the Rescue Robotics Days at the 112Rescue trade fair in 06/2024 and 06/2025. A poster presentation was also prepared for the 2025 "EU Science for Preparedness Conference" on 04/11/2025.

Figure 5: CREXDATA poster displayed at the DRZ stand at the Innovation&Technology Exp, Brandweerevent 10/2024. Researcher Ivana Kruijff (DRZ) discussing situation awareness tools with first responders

A project overview presentation was also prepared and is available for download on the project website (on the 'Goals and objectives' page).

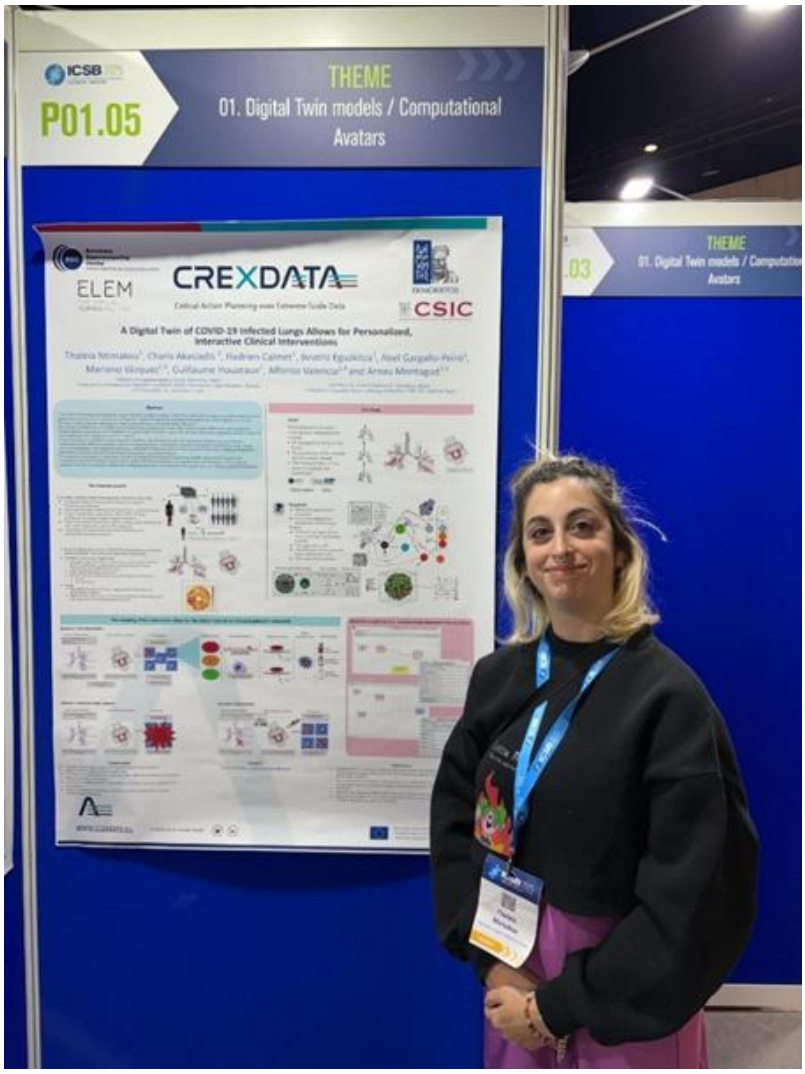

Figure 6: Researcher Thaleia Ntiniakou with the CREXDATA poster at ICSB 2025

Project videos

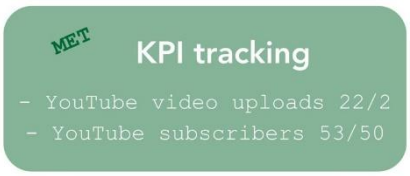

Figure 7: Video KPI tracking

During M1-M18, the project's YouTube channel was launched and populated with the "Project Partner Presentation" video series and the project overview animation video, as documented in *D6.2.* These videos sought to raise awareness of the project and the work done by each consortium partner and were used at various events and through the project's social media accounts. Consortium members have also promoted the videos.

In the second half of the project, the YouTube channel had 22 videos organized into four thematic playlists, in addition to the introductory video: 1) Partner presentations (from the first period), 2) Health Crisis Use Case, 3) Maritime Use Case, 4) Weather Emergencies Use Case. These videos provide more specialized insight into the different project topics and underlying technologies. To improve visibility and usability, a dedicated webpage was created to enable direct access to the YouTube channel via the project website, contributing to increased traffic and viewership via the website. The target of 50 YouTube subscribers was fully reached, the 627 visualisations recorded across project videos indicate that the content was actively accessed.

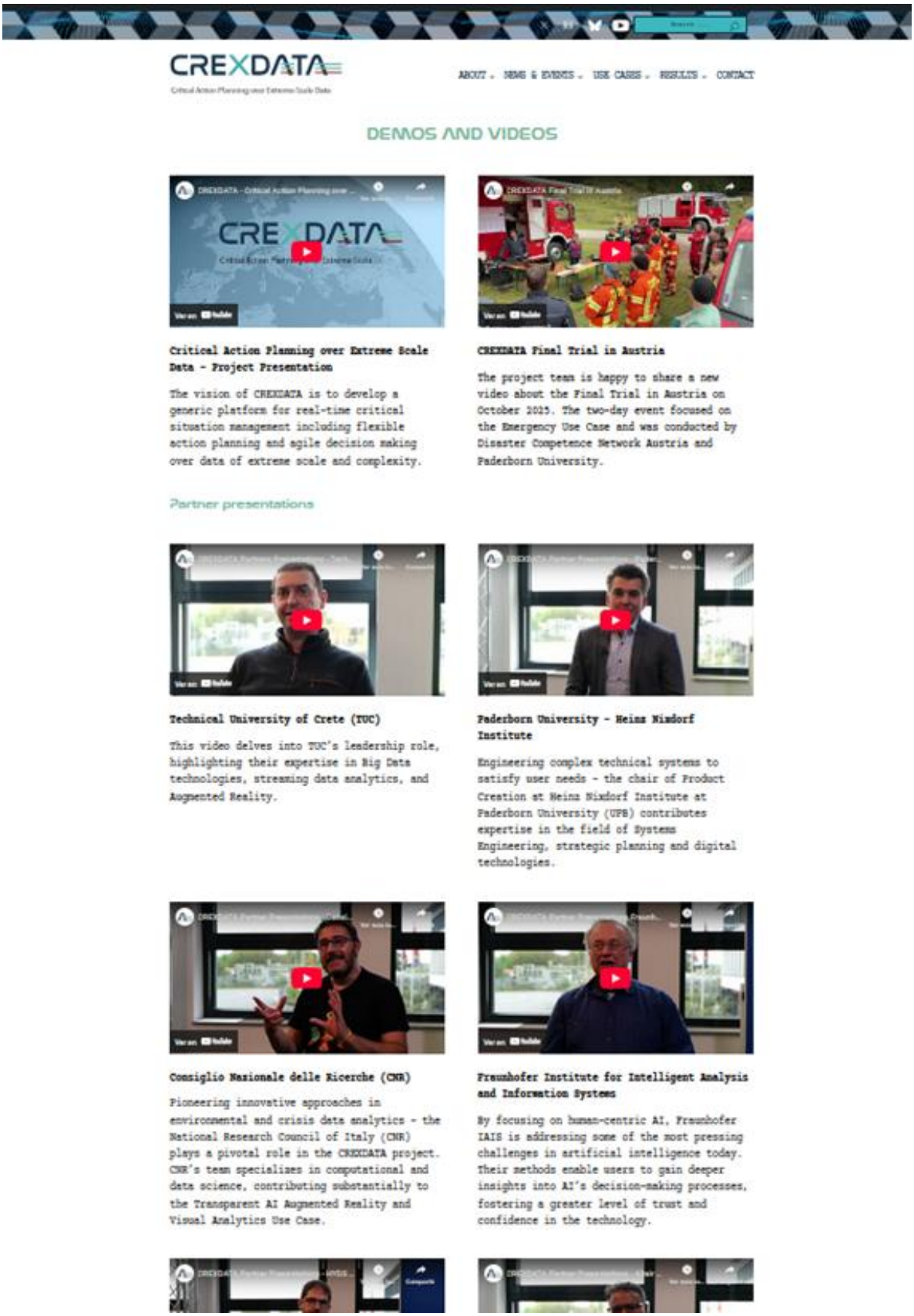

Figure 8: CREXDATA Demos and Videos webpage overview

2.1.3 Press strategy

Press releases and engagement with the technical media have been useful for amplifying key project accomplishments and sharing the project's results and progress with the scientific community and the specialized press. A press release was launched at the beginning of the project, and one will be launched immediately following the project's close to attract more interest in the project and to bring attention to the final project results. The project has also had presence on external dissemination channels, so far appearing in a total of 24 press impacts which are available on the project website.

2.2 Dissemination and communication channels

The website and social media channels were created following the guidelines established in D6.1 and updated in D6.2. The task 6.1 leader was responsible for keeping the website updated and maintaining consistent activity on social media, not only in terms of publishing content but also in increasing followers and engaging with other similar accounts of interest to CREXDATA. The activity and interaction with these channels were periodically monitored to ensure our messaging matched the needs of our audiences and allowed us to adapt our strategy if needed.

2.2.1 Website (https://CREXDATA.eu)

Figure 9: Website KPI tracking

The project website is the project's central communication channel. It hosts up-to-date information about events, publications and results. Since M18, the dissemination team has focused on improving the quality of the website's content in addition to keeping it updated.

The following pages have been updated:

- Goals and objective: The project presentation video was added to this page with the option to download it.

- Branding: In addition to the logos, the promotional material such as all the flyers produced and the roll-up banner can be downloaded from here.

- Publications: Efforts have been made to make the publications' page more accessible, improving its display on the homepage and expanding the details of each publication. This allows users to easily and immediately see the 'Publication Type', 'Title', 'Year', 'Authors', and 'Place of Publication'. New filters have also been created on this page to facilitate searching, most notably the 'Publication Type' filter, which includes options such as: Abstract, Poster, Thesis, Journal Article, Conference Proceedings/Workshop, and Oral Presentations.

- Demos and videos: This newly created page offers an easily accessible place where all the videos produced by the project have been shared, with the aim of making them much more visible and generating traffic between the website and the YouTube channel.

Additionally, more than 40 news pieces have been published throughout the project, covering: project activities, participation in events, analysis of technological advancements, Memoranda of Understanding (MoU) reached with other projects, and regular meetings held among consortium members. All news pieces are published on the 'News' page of the project website and have been disseminated through the project's social media channels.

Since its launch, a satisfactory performance of the main values has been observed, with a notable increase in the last year. At M18, there were 2.3K sessions and 1.5K active users. **At M36 these values have more than doubled with 5.4K sessions and 3.8K active users.** Moreover, there has been an **89.8% increase in engaged sessions,** suggesting that the project website is reaching its target audiences.

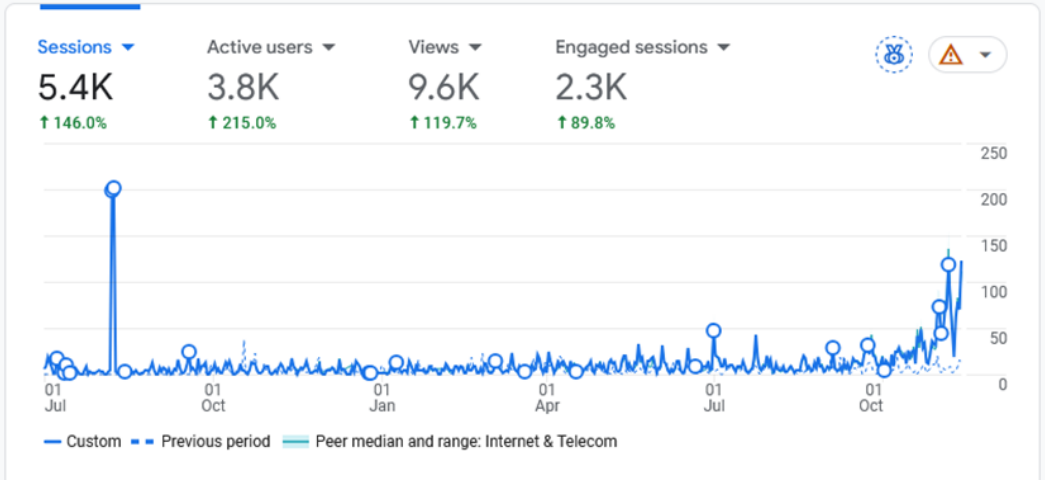

Figure 10: Google Analytics website report (M19-M36)

It is also important to highlight the most visited pages on the project website. In this case, between M19 and M36, the page that received the most visits is the 'Home page' with 3,305, followed by the 'Publications' page, with 846 views in this latest report. The third most visited page is the 'Partners' page, followed closely by 'Goals and objectives'.

2.2.2 Social media

Figure 11: Website KPI tracking

The project's presence on social media over this period has been notable, with increasing its number of followers on both LinkedIn and X. The KPI set for social media followers was 300 total followers and the project has surpassed that with 344 followers, with a different distribution between channels than initial expected. LinkedIn has been especially successful, with high engagement rates and growing followers (see details below). Following the D6.2 report, it was decided that given the controversy over X, the Bluesky social network would be experimentally tested alongside our original these two social networks. Many academic and scientific community users migrated to the new Bluesky network, and it was decided to create a CREXDATA profile to reach a wider audience. However, knowing it was the project's final year and that Bluesky was still in its early stages, the approach was experimental, with significantly more

effort focused on the LinkedIn profile, for example, which is yielding very positive results in terms of engagement.

Social media is a valuable tool for disseminating key project results, including publications, presentations, news, and more. It is also important for drawing attention to the project website where visitors can explore more information. The project‘s activities were summarized and adapted into a social media format with a link to the website. The dissemination team sought to ensure that social media accounts were updated at least three times a week, especially in the final months of the project where more results were available. Furthermore, interaction with similar accounts, as well as reposting content from consortium members or researchers, allows for reaching an even wider audience and helps segment specific audiences within the European community and industry, thereby amplifying the project's impact and expanding its reach. Social media is an important part of the outreach objective for community building. Growth on both networks has been achieved by focusing efforts on interacting with the community, generating content of interest, and appealing to industry stakeholders.

LinkedIn

CREXDATA's LinkedIn page has seen an increase in followers, reaching 259 in the M36 and exceeding the initial target set in the KPIs (100). In fact, interactions on this social network are above expectations, achieving good results in terms of views and followers.

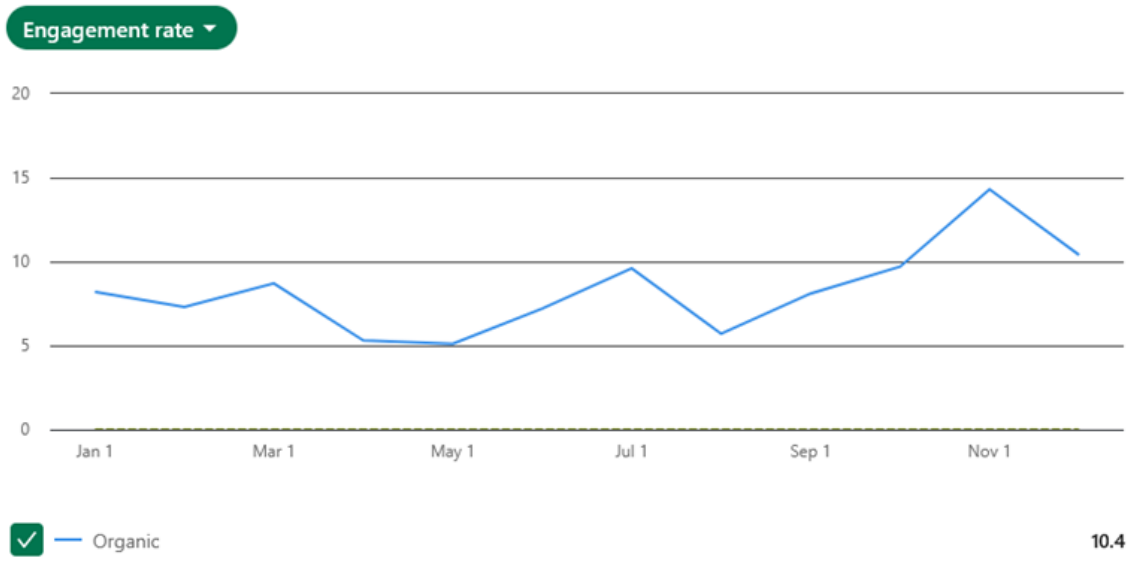

Figure 12: LinkedIn analytics, engagement rate (M24-M36)

As we can see in Figure 12, the page's engagement rate is excellent, with an average of 10.4 points. Furthermore, the number of impressions on LinkedIn reached 17,666, which is a good result. Some examples of posts with the most impressions are: the announcement of the publication of the paper DAG*: A Novel A*-alike Algorithm for Optimal Workflow Execution across IoT Platforms, with 750 impressions; a post about a consortium virtual meeting where some milestones were defined, reaching 879 impressions; the publication of the video from the final trial in Austria from last October, detailing how the event went, with 889 impressions; and the last post with a very good engagement rate is the one about the

CREXDATA participation at Smart City Expo World Congress last November, reaching the 332 impressions. These posts are a good example of the variety of publications that can be found on the project's LinkedIn profile, and how users show interest, in a homogeneous way, in the different activities of the project, from scientific publications to events and the publication of results.

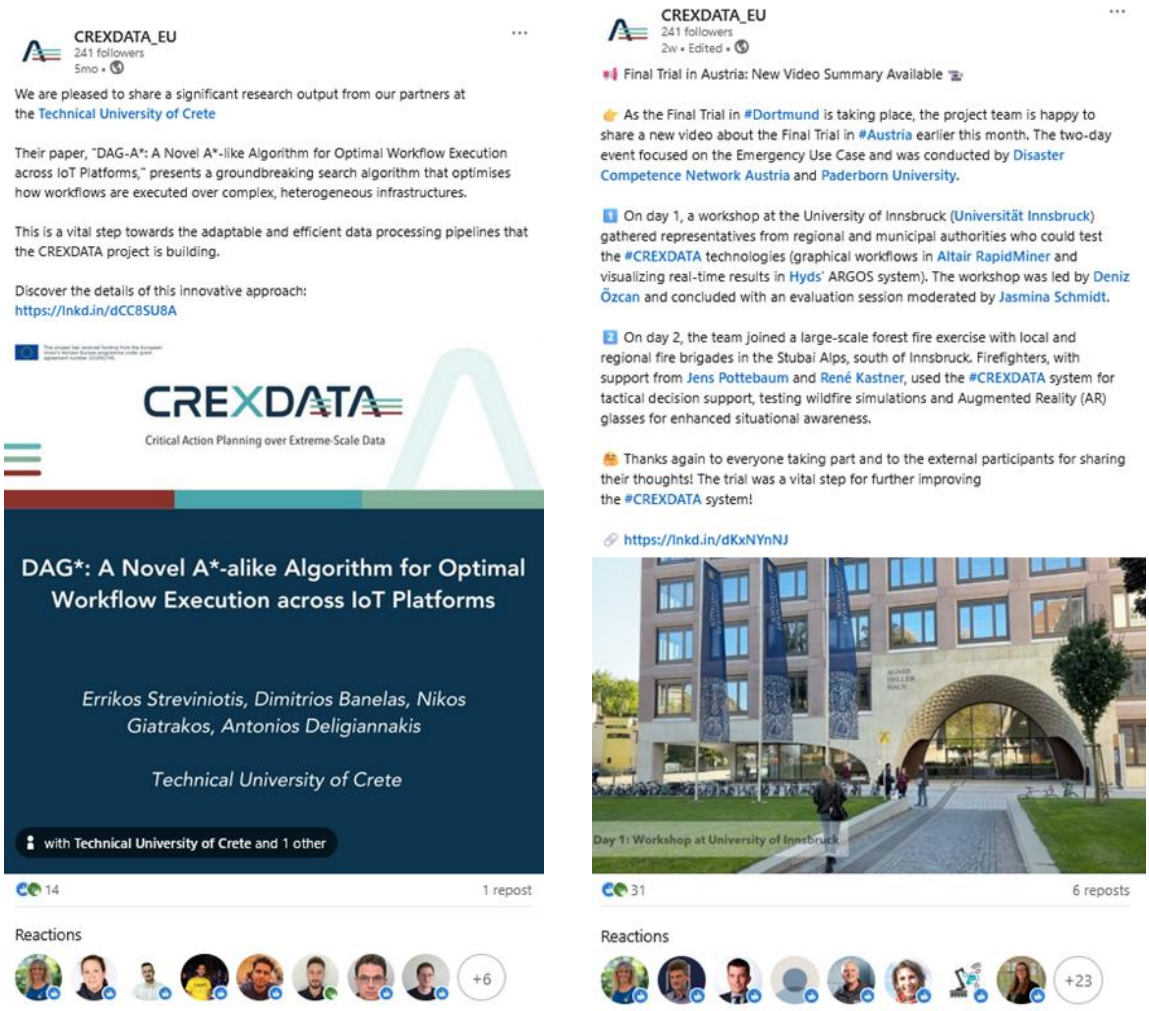

Figure 13: Examples of successful LinkedIn posts

X (formerly Twitter) and BlueSky

Currently, CREXDATA's X account has a total of 85 followers, a gradual increase since the last report. In this case, the defined KPI (200) has not been reached, due to the instability of this social media platform. Instead, efforts have been shifted to increasing the number of followers and boosting engagement on LinkedIn.

It is true that the reality of this social network is constantly changing, and in recent months, as mentioned in the introduction to this section, a migration of accounts from the scientific field to the Bluesky network has begun.

Regarding the analysis of the publications with the most impressions this past year, the following publications stands out: the publication of the open-source epidemic simulations with Epi-Sim and CREXDATA, with 1327 views; the presentation of the project by the BSC

in the Mobile World Congress 2025, about the disaster response, with 107 views; the post about a new technical publication, 'RATS', with 192 views; and the CREXDATA participation at the Smart City Expo World Congress, with 190 views.

The engagement with these posts exemplifies, once again, how the community shows its interest in the variety of activities in which the project participates, as well as the new results or the sharing of knowledge.

The CREXDATA BlueSky account (@crexdata-eu.bskysocial) mirrored the activity posted in the project's X channel. Despite these efforts, the number of followers only reached 27 with little engagement from audiences.

2.3 Events and publications

2.3.1 Events

Participation in external events has been key to raising awareness of the CREXDATA project, as well as establishing contacts with industry, stakeholders, and academia. It is also one of the best platforms for showcasing the project's results and achievements. For this reason, participation in events has been crucial in lasts months, and all members of the consortium have actively participated.

The consortium was extremely active from M19-M36 in a variety of third-party events, including scientific workshops (2), tutorials (1), exhibits and fairs (6), demos in conferences (4), industrial workshops (2) and poster sessions (5). Given the large number of events, the list of all the events is included in Appendix 1 of this report. As can be seen from this list, the KPIs defined at the beginning have been achieved and there has been a range of event types, participation and impact.

Figure 14: KPI tracking

Top participations from M19-M36 include events such as the ACM Summer School on Data Science 2024 where the course "Can computers understand what is happening? An introduction to complex event recognition" was taught, delving into the sophisticated methodologies and applications of CER. Another notable participation was the session given together with the TEMA project at the European Big Data Value Forum 2024, with the presentation "Emergency Management: Challenges and Solutions." EBDVF target audience includes industry professionals, business developers, researchers and policymakers from all over Europe and other regions of the world to advance policy actions, and industrial and research activities in the areas of Data and AI. The event is hosted every year in the country that holds the European Presidency, and it is a good stage to present the resources and solutions developed within the framework of the project. The contributions to the event organized by the Big Data Value Association (BDVA) were continued in 2025, participating EBDVF 2025 (see Figure 4) with an information booth.

Figure 15: Presentation of CREXDATA Use Case at EBDVF 2024

Other events that focused on industrial professionals, policymakers and innovators include the Smart City Expo World Congress 2024 and the Mobile World Congress 2025 (MWC). In the first, the health use case was presented, in collaboration with the MePreCiSa project, with whom the project has a MoU. And in the second case, the BSC researchers gave the presentation "AI-Powered Situational Awareness for a Future of Unprecedented Climate Disasters" on the stage of the Barcelona Supercomputing Centre located in 4YFN25, part of MWC Barcelona 2025, which was very well-received by the audience.

Figure 16: Presentation by BSC researchers Oriol Pla Casas and Jonathan Orama at MWC 2025

The CREXDATA project has taken part also in several events where the target audience was academia. For example, Kpler's presentation at the 28th International Conference on Extending Database Technology (EDBT2025) showcased two data-intensive applications designed for real-time maritime safety and situational awareness. TUC also held a session at the IEEE International Conference on Data Engineering (ICDE), in Hong Kong from May 19 to 23, 2025. Additionally, the project was featured in a workshop called “Experiences from UAV Deployments in Weather-Induced Emergencies” during a disaster research symposium organized by DCNA in Wels, Austria on September 18, 2025. The workshop was organised together with the COLLARIS2 project and focused on drones and robotics.

In the last few months of this year, the project also participated in two leading European events. Firstly, the project successfully presented its latest advancements in data-driven crisis response at the EU Science for Preparedness Conference, held from November 4-6, 2025, in Turin, Italy.

Figure 17: Researcher Niklas Döhner (UPB) at EU Science for Preparedness Conference

And secondly, the project demonstrated the Weather Emergencies Use Case technologies in the workshop “Resilience to Natural Hazards through AI Solutions”, that took place in Brussels, Belgium, on 11 December 2025. The workshop was hosted by the Commission and was held in conjunction with the 3rd Meeting of the Global Initiative on Resilience to Natural Hazards through AI Solutions.

Figure 18: Senior Researcher Dr.-Ing. Jens Pottebaum, Niklas Döhner and Marcel Ebel (all UPB) at the Global Initiative on Resilience to Natural Hazards through AI Solutions

Three crucial events were organized under the framework of the weather emergencies use case to bring research and applications together for testing by end-users in the final trials held in Innsbruck (Austria), Dortmund (Germany) and Kuopio (Finland). These events were critical for testing CREXDATA solutions on the ground and obtaining feedback from the first-responder community.

Figure 19: A firefighter tests the AR glasses during the final trial in Austria

2.3.2 Publications

Figure 20: Publications KPI tracking

Thanks to the efforts of all members of the consortium, CREXDATA has produced a total of 57 publications during the project. This number vastly exceeded our initial goal of 6-8 publications in top-tier journals, and 20 academic conferences throughout the project. Of these publications, 24 are in journals and 33 are papers published in academic conferences proceedings or workshops. Additionally, 10 PhD and Master's theses have been published wholly or partially under the framework of the project.

Publications and Open Access guidelines were continuously communicated to all partners. All publications are accessible on the website page and also in the project's Zenodo community. Appendix 2 provides the comprehensive list of publications related to the project (M19-M36).

2.3.2.1 Theses

The CREXDATA project demonstrates its strong academic impact, with a series of successful theses completed across partner universities and research institutes. **Eleven master's and three PhDs theses** highlight the project's commitment to advancing cutting-edge research in data assimilation, explainable AI, and crisis management technologies.

Table 2: CREXDATA Master Theses and PhD Theses

Partner name	Theses
TUC	Michail Theologitis, "Communication-Efficient federated deep learning via dynamic averaging", Master Thesis, School of Electrical and Computer Engineering, Technical University of Crete, Chania, Greece, 2025
TUC	Dimitrios Banelas, "Motion and object detection from streaming video on Apache Flink", Diploma Work, School of Electrical and Computer Engineering, Technical University of Crete, Chania, Greece, 2023
TUC	Georgios Lamprinakis, "Head-Worn augmented reality for Real-Time navigation assistance and event forecasting in maritime operations", Diploma Work, School of Electrical and Computer Engineering, Technical University of Crete, Chania, Greece, 2025
TUC	Ioannis Safranoglou, "An augmented reality system for real-time decision-making in flood emergencies", Diploma Work, School of Electrical and Computer Engineering, Technical University of Crete, Chania, Greece, 2024
TUC	Konstantinos Charalampakis, "Design and implementation of an augmented reality system for navigation, team coordination, and real-time data visualization in firefighting operations", Diploma Work, School of Electrical and Computer Engineering, Technical University of Crete, Chania, Greece, 2025

TUC	Georgios Frangias, "Federated learning at TensorFlow using the geometric approach", Diploma Work, School of Electrical and Computer Engineering, Technical University of Crete, Chania, Greece, 2023.
UPB	Dennis Skara, "Entwicklung einer software-gestützten Entscheidungsunterstützung zur Auswahl von Methoden im Innovationsmanagement", Master Thesis, Industrial Engineering, Paderborn University, Paderborn, Germany, 2025
UPB	Tamer Tevlik Özenirler, "Anwendungsfälle für maschinelles Lernen und Simulation beim Einsatz von Rettungsrobotern in Gefahrensituationen", Master Thesis, Industrial Engineering, Paderborn University, Paderborn, Germany, 2024
UPB	Thomas Hesse, "Identifikation und Bewertung von Auswirkungsmustern zwischen Testergebnissen und Anforderungen im Model-Based Systems Engineering", Master Thesis, Industrial Engineering, Paderborn University, Paderborn, Germany, 2024
CNR	Elenora Cappuccio, "Design and development of explanation User Interface: Interactive visual Dashboards and Design Guidelines for Explainable AI", PhD thesis, University of Pisa (pending publication)
CNR	Alessandro Carella, "Interactive visual interfaces for synthetic neighbourhoods and rule based explanations", Master Thesis, University of Pisa (pending publication)
CNR	Ricardo Galarducci, "Generative XAI System Providing Explanations for Image Classifier Targeting Psoriasis Lesions Severity" Master Thesis, University of Pisa, 2024.
FMI	"Windstorm Impacts on the Electrical Grid: Meteorological and Non-Meteorological Drivers," PhD thesis, University of Helsinki, 2025.
NCRS	Periklis Mantegnoglou, "Reasoning over Complex Temporal Specifications and Noisy Data Streams, PhD thesis, National and KApodistrian University of Athen, 2024.

2.4 Equality and diversity

The CREXDATA project has placed emphasis on promoting the presence of women in the fields of science and technology and ensuring that equal conditions are provided for all project members, while respecting diversity. A key action has therefore been to integrate these two factors into the project's communication activities. For this reason, a dedicated "Equality and Diversity" webpage was created on the project website.

The commitment to promoting equality and diversity within the project has not only served to reinforce the project's values but has also provided a visible statement of support for diversity in European research and innovation.

2.5 Communication and dissemination takeaways

Overall, the project's communication and dissemination activities have been successful, meeting most KPIs while remaining flexible enough to adapt to emerging opportunities. Over the three-year period, the consortium increased the project's visibility, expanded its engagement channels, and ensured that results reached their intended audiences. Key achievements include more than doubling the website user base, significantly increasing the number of publications produced and participating in more third-party events than initially foreseen.

Together, these efforts have generated interest in the project, consolidated a growing community of users engaged with project updates and technological outputs, enabled knowledge exchange through meetings, events, and conferences, increased media coverage across different channels and fostered collaborations with other stakeholders.

3 Community and Partnership through Cohesion Activities

As mentioned in the previous report, the CREXDATA project thrives on a robust network of community and collaborations that enhance its impact and broaden its reach. Within this context, activities (e) 'Provide guidance to transform research efforts into business value for target groups of the CREXDATA solution' and (f) 'Emphasize the advantages of the achievements over existing solutions' were addressed.

Cohesion activities in CREXDATA are designed to foster communication, collaboration, and strategic alignment between the CREXDATA project, other related projects and key stakeholder ecosystems. These include Public-Private Partnerships (PPP) in AI, Data and Robotics (ADR), civil protection communities (e.g., CERIS, EENA, FEU), and platforms like AI4EU/AI-on-Demand. The overarching goal is to ensure CREXDATA technologies and results are aligned with real-world needs, adopted by relevant communities, and positioned within the broader European innovation landscape.

Task 6.3 coordinates these efforts under the joint leadership of DRZ and MT. DRZ focuses specifically on building bridges between the project and civil protection actors, while MT focuses on outreach to the AI, Data and Robotics (ADR) ADR and AI4EU stakeholders. Activities under this task include the organization of and participation in joint events and thematic workshops, contribution to clustering initiatives, community engagement through presentations and panel discussion and sharing assets, such as data and software solutions. Where relevant, collaboration efforts are formalized through Memoranda of Understanding with specific partners/projects.

In the first project period (M1–M18), first contact points were established with related projects such as COLLARIS, TEMA, and ExtremeXP. CREXDATA was also presented at the CERIS Disaster Resilient Societies event. The comprehensive mapping of relevant communities and events was aided by gathering input from all project partners through an internal workshop held at the Barcelona consortium meeting (April 2024). This workshop identified 12 relevant communities and events, 15 possible workshop topics, and 9 EU projects as potential collaboration partners (see Appendix 6.4 for details). These outcomes informed the planning of concrete subsequent activities.

In the final project phase (M19–M36), activities intensified with more targeted outreach. These efforts helped consolidate CREXDATA's position within the European innovation ecosystem and created new opportunities for sustained impact beyond the project duration.

AI.BIG Cluster CREXDATA is part of a cluster of projects under the initiative "AI and Big Data Analysis for Emergency Situations and Extreme Data Exploitation." In addition to CREXDATA, the following two projects are involved:

- ExtremeXP: Aims to develop a decision support framework for crisis management using big data, machine learning, and visual analytics.
- TEMA: Improves natural disaster management through automated 3D mapping and disaster prediction.

In M19-M36, we have continued to collaborate with both projects, sharing knowledge, holding regular meetings and attending events together, such as the joint presentation at the "AI4Sustainability TEMA High-level" webinar or the successful joint exhibition at the

Innovative Emergency Management Showcase at the Emergency Services Academy of Finland (ESAF) in Kuopio.

Memoranda of Understanding This period also allowed for the CREXDATA community to grow, including through agreements that led to the signing of two Memoranda of Understanding (MoU):

- MePreCiSa: with the aim of setting up a strategic alliance aimed at fostering collaboration in urban health research and big data integration.
- COLLARIS: to promote best practices and support for uptake of lessons learned regarding the use of drones and processing of data collected by sensors carried by drones in emergency response.

Sharing Results with the Community CREXDATA remains committed to sharing its results with the community. Publications are consequently shared on Zenodo. Other assets are shared also through the the AI-on-Demand (AIoD) platform. In addition to having a profile on this platform, project results are being linked so that they will live on and continue to be accessible to the EU AI community after the project end. Sharing datasets is one example. Examples of data created in the project and shared with the community through Zenodo and AIoD include drone images and mapping data from the Emergency Use case; data from the sea trials and the collision dataset from the Maritime Use Case. Additional AI assets shared with the AIoD include the EpiSim.jl package for simulating epidemic spreading in metapopulations from the Health Use Case and the Vessel Route Prediction Models for the Long-term (EnvCLUS*) and Short-term (Bi-LSTM S-VRF) from the Maritime Use Case. Finally, other assets include the hazardous weather routing algorithm developed in the context of the Maritime Use Case presented in the paper Dynamic Weather-Resilient Vessel Routing using Big AIS Data.

Joint Sessions and Workshops. CREXDATA partners also remain committed to knowledge-sharing activities conducted jointly with other projects. In M19-36 this included:

- Joint session with TEMA at BDVA Data Week 2023, Athens, Greece, 27.-28.5.23
- Joint session with MePreCiSa, showcasing the health use case, at 2024 Smart City Expo, Barcelona,Spain, 5.11.24
- Participation in MePreCiSa Workshop *From Data to Action: Urban Health in a Changing World*, 12.6.25
- CREXDATA and TEMA at R&D Days at ESAF in Kuopio, Finland, 10.-12.6.25
- Workshop *Experiences from drone deployments in disaster response*, organized by CREXDATA, COLLARIS and TEMA at the DCNA conference during the Rettermesse in Wells, Austria,18.-20.9. 25
- Workshop *AI-Powered Search&Rescue Robotics* co-organized and moderated by CREXDATA, with panelists from several EU projects at the AI, Data and Robotics Association (ADRA) Forum, Stavanger, Norway, 23.-24.9.25
- EU Forum *From Policy to Practice: European Innovation and International Collaboration for Safety & Security*, SSRR2025 conference, Galway, Irland, 30.10.25

- Joint session with EXTRACT *From Crisis to Action: How AI and Data Technologies Are Closing the Reaction Gap at "Moment Zero."* at 2025 Smart City Expo, Barcelona, Spain 6.11.25
- Contribution to Workshop *Implementation of New Technologies in Operational Activities of Crisis Management and Civil Protection Services - AI, Drones, and Satellites for Real-Time Situational Awareness in Disaster Response* organized by COLLARIS-2, Overwatch and DIREKTION, 21.11.25
- Contribution to Workshop A+A 2025 -- Weltleitmesse für sicheres und gesundes Arbeiten,
- EU Forum and project booth at "EU Science for Preparedness Conference", Turin (Italy), 11.11.2025
- EU Forum and Project booth at EBDVF 2025, European Big Data Value Forum, Dgi Byen, Copenhagen, Denmark 11.11.2025
- EU Forum and Project booth at Global Initiative on Resilience to Natural Hazards through AI Solutions, Brussels, Belgium, 11.12.2025

Comprehensive information on Community and Partnership activities is available on the corresponding page of the project website.

4 Exploitation Activities and Final Version of the Business Plan

This chapter updates, further develops and broadens the results produced and reported in the deliverables D6.1 and D6.2. CREXDATA revolutionises emergency management and broader action planning practices by transferring the current state of practice to a completely proactive, online paradigm. The first section presents the final KERs based on the KERs initially created in D6.2.

4.1 Overarching Methodology

This chapter describes the methodological approach used to carry out the exploitation activities in CREXDATA. First, stakeholder needs in the use cases were analysed on the basis of the requirements pull strategy. The three CREXDATA use cases in the Emergency, Health and Maritime domains were used to identify, collect and analyse requirements. In a preparative step, all use cases detailed their application scenarios from a technical requirements perspective towards potential uptake of the expected integrated platform. The main building blocks of the methodology are:

- Application-oriented approach (requirements pull): Real needs and requirements for further fields of application are derived from the three use cases (WP2). This results in concrete problems and usage requirements for technological development in the project.
- Technological advancement (technology push): The technologies developed promote innovative solutions beyond the original use cases, with a focus on innovative strength, scalability, and transferability to new markets.
- Derivation of the value proposition: The identified Key Exploitation Results (KERs) are described precisely in order to define concrete added value and derive marketable products and services.
- Business modelling and planning: The value propositions are incorporated into a Business Model Canvas (BMC), taking into account key partners, activities, resources, and customer relationships. The goal is to develop a joint exploitation strategy at the partner and consortium level, as well as a business plan with short-, medium-, and long-term measures for commercialization.

Based on a WP2-related perspective (requirements pull on the left in Figure 22), the exploitation-oriented perspective of WP6 was initiated, where the different types of tools and their integration into actionable workflows were used as inputs (technology push on the right in Figure 21). Utilizing an online survey to collect relevant information, initial information used to carry out these activities was provided by the consortium partners during the interactive workshop held by UPB on 11.04.2024. The partners provided useful contributions to the definition and characterisation of the project results and their exploitation, utilizing the Value Proposition Canvas as a tool. The main objective was to form a common understanding of value within the consortium. Based on partners' backgrounds, the Description of Action and initial descriptions of partners' objectives, an initial list of envisaged exploitable results was created. Following this and after evaluating the workshop results, online workshops were held. In the online workshops, the list of identified exploitable results was validated to complete the tables characterising the most important exploitable results, and to discuss exploitation pathways. More detailed information was determined in special interviews with

the partners responsible for the individual exploitable results in order to characterise them in terms of their innovative content, target market, exploitation requirements and responsibilities. Based on the development of the exploitation strategy, shown in Figure 22, a preliminary list of Key Exploitable Results (KERs) and initial business models was created and validated in further online workshops. The results of the workshops were summarised in a final report and in an Excel file, which was submitted to the partners for validation.

While all of these aforementioned steps represent an inside-out perspective, constraints and potentials were analysed by deepening the research on future markets. Based on the foresight analysis, megatrends were identified that have an impact on potential areas of innovation. The identified areas of innovation affect CREXDATA's KERs and are located within them. To have a future-robust business model, it is necessary to address the potential impacts.

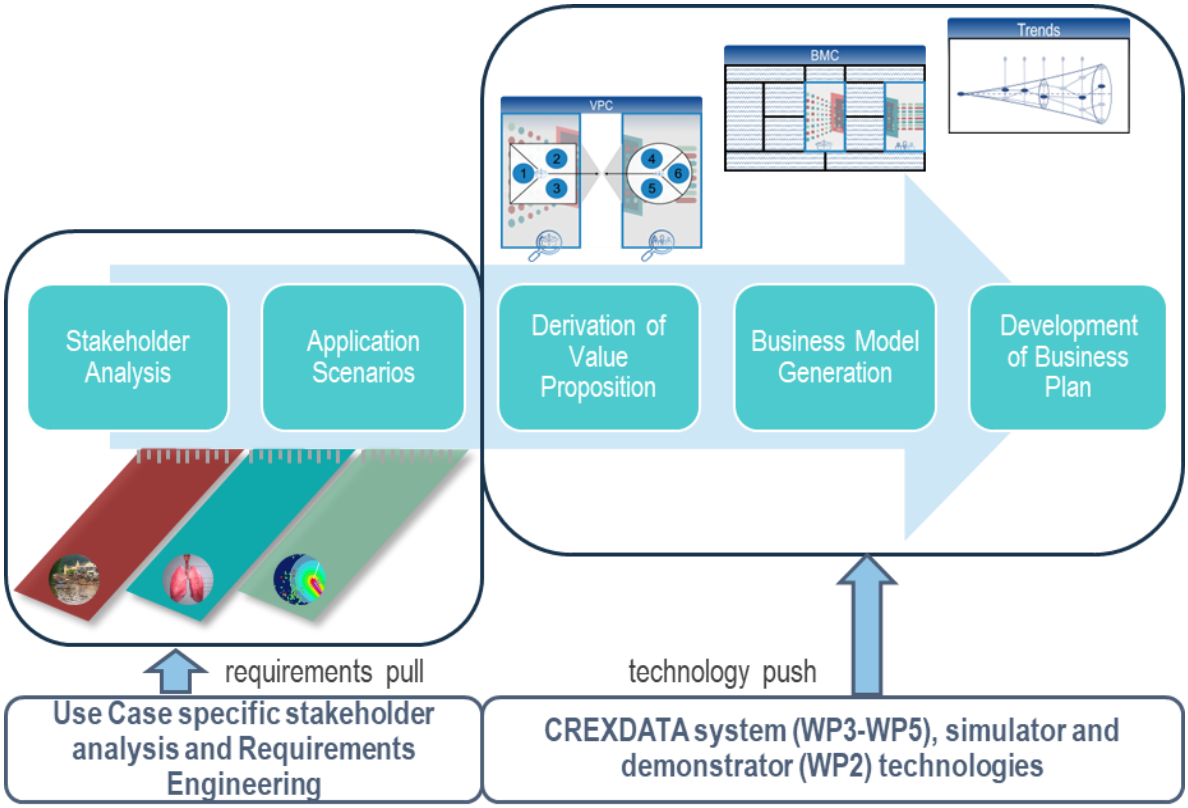

Figure 21: CREXDATA Exploitation Plan

The exploitation strategy outlined in deliverables D6.1 and D6.2 was sharpened in terms of specific market-oriented KERs and the clear assignment of roles and paths to commercialization. The development of the exploitation strategy distinguished two levels:

- Partner level: Research and technology partners (including for the development of models, tools, algorithms) identify components of the overall CREXDATA solution that can be used and commercialized.
- Consortium level: Types and forms of CREXDATA use are specified, exploitation paths are defined, and prioritized measures for further use are planned.

This structure forms the basis for the further development of the business plan. A distinction is made between individual competences and consortium competences. Requirements are derived for the utilization of core competences in combination with future-robust Business Models (BM). The method for creation of future-robust CREXDATA BM comprises five steps to achieve the goal (Figure 22). The five steps are:

- Identification of Core Competences (1)
- Identification of Target Scope (2)
- Valuation of options (3)
- Identification of Innovation Fields (4)
- Creation of Business Model (5)

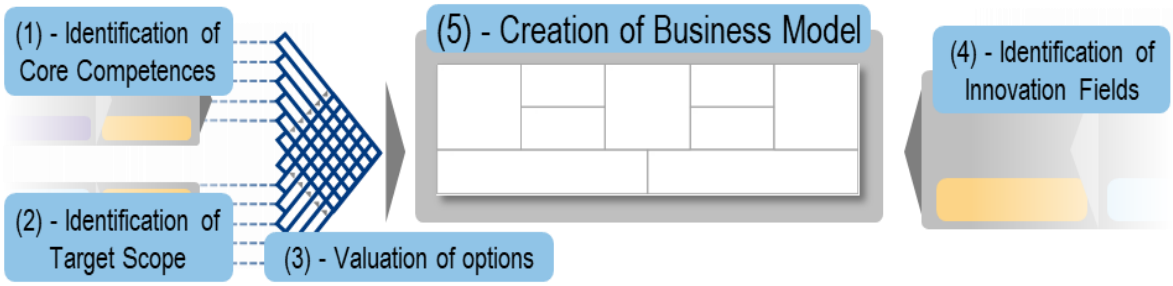

Figure 22: Method for creation of future-robust business model

4.2 Key Exploitable Results

In the deliverable D6.2, an initial KER table is presented. The initial KER table was updated in workshops and expanded to include additional relevant fields. The overview contains all information on the KERs, divided by partner. Steps one, two and three are internal factors like decisions which are made through decision makers. They can be adapted or changed by the company itself and are fed into the model from the left as visualized in Figure 23.

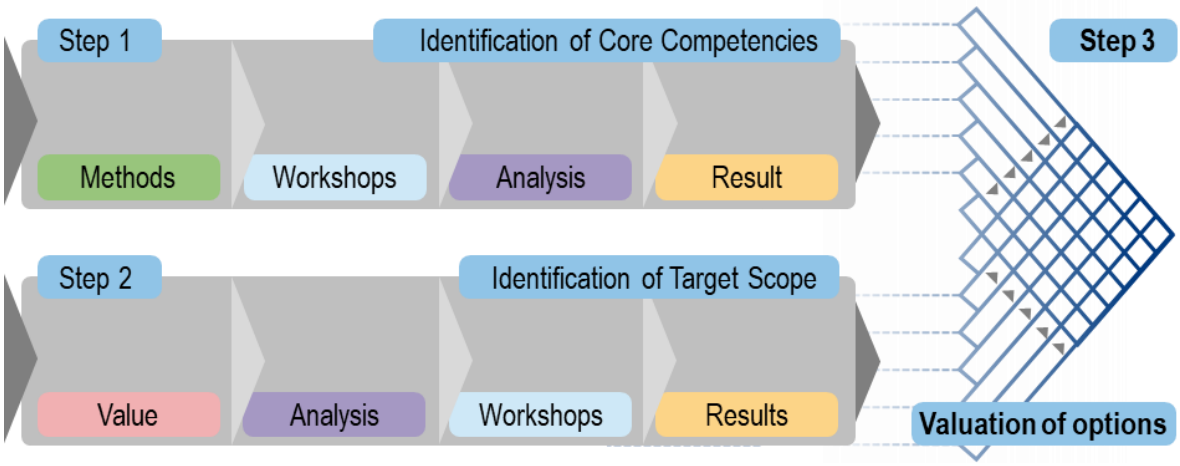

Figure 23: Step three - Valuation of options

In order to examine the KERs in more detail, workshops were held to create the table for each partner. The template to be used begins with the metadata for each partner, including

partner name, role in the CREXDATA project, and identified target groups and relevant stakeholders. The table contains an overview of the Key Exploitable Results (KERs) developed in CREXDATA, their description, type of result and market indications. The columns of the table contain detailed information on the KERs. The three tables below consolidate the methodological framework applied for the identification, characterisation, and exploitation planning of the KERs generated within CREXDATA. They bring together the technical, intellectual-property, and economic dimensions of the project's innovation outputs in a harmonised structure that can be used for internal monitoring and external reporting.

- A first list captures the essential identification parameters of each result, its ownership status and technical nature. The structure of the list characterising the core metadata of each KER is presented in Table 3.
- A second list focuses on exploitation and market aspects, documenting intended use cases, potential users, customer benefits, and economic indicators such as maintenance and selling price estimates. The structure is presented in Table 4.
- A third list summarises the maturity level and risk-related elements, including TRL assessment, development gaps, resource needs and responsible contact persons for each result. The structure of this third list is presented in Table 5.

Table 3: General information per partner of Key Exploitable Results

Column name	Scientific / methodological description
N°	Sequential numbering of the Key Exploitable Result (KER) for unique identification throughout all project documentation.
Name of the Key Exploitable Result	Short title of the result, describing its main technological or functional feature.
Other involved partners	List of consortium partners contributing to the development, validation, or integration of the result.
If yes, who?	Specific identification of partners involved and their roles (e.g. developer, data provider, end user, integrator).
Joint ownership	Indicates whether the result is jointly owned by more than one partner under the consortium agreement.
If yes, who?[2]	Partners with shared ownership; to be cross-referenced with a formal Joint Ownership Agreement if applicable.
Standalone Result / Integrated in CREXDATA System	Specifies whether the result can be exploited independently or forms an integral component of the CREXDATA platform.
Intellectual Property Strategy	Description of the adopted IP protection approach (e.g. copyright, patent application, license type, trade secret) and responsible partner(s).
Type of Result (Algorithm / Model / Method / Process / Software / Knowledge)	Classification of the nature of the result, ensuring comparability across partners and disciplinary domains.

Table 4: Key Exploitable Results market aspects, potential users, customer benefits and economic indicators

Column name	Scientific / methodological description
Exploitation Plan	Planned exploitation of the result beyond the project lifetime (commercial, academic, open-source, or internal exploitation).
Potential customers	Identification of potential end users or market segments expected to benefit from the result.
Benefit to customers	Qualitative and, where possible, quantitative description of customer value (e.g. efficiency gains, cost savings, accuracy improvement).
Consultancy service / Academic exploitation / Commercial exploitation	Enumeration of the main exploitation routes: consultancy, research and education, or commercial product/license activities.
Estimated maintenance cost	Approximate annual cost for maintenance, updates, or operation after the project ends.
Estimated yearly selling price	Indicative market price or expected annual revenue potential if the result is commercialised.
Target group	Key stakeholder or user groups addressed by the exploitation strategy (e.g. public authorities, SMEs, research organisations).
Competitive advantage of the solution	Description of the uniqueness and strengths of the result in comparison to existing state-of-the-art or competing solutions.

Table 5: Key Exploitable Results maturity level and risk-related elements

Column name	Scientific / methodological description
Technology Readiness Level	Assessment of technological maturity following the EC TRL scale (1 = basic principles, 9 = fully market-ready product).
Gaps until market readiness	Description of remaining development steps required to reach commercial maturity (e.g. testing, certification, deployment).
Resources & budget requirements	Estimated resources (time, staff, budget) necessary for further development or market introduction.
Technical risks & barriers	Identification of technical, operational, or regulatory obstacles that could hinder exploitation.
Code / Solution commented?	Indicates whether the software code or the technical documentation is properly commented and understandable for reuse.
Storage location of all data of the solution	Reference to the location where datasets, source code, or artefacts are stored (e.g. institutional repository, project GitLab, DOI).
Contact person	Responsible person within the consortium for coordination, updates, and internal communication regarding this result.

Together, these lists provide a comprehensive view of how each partner plans to derive value from their innovative outputs and research results. They also ensure transparency regarding intellectual-property management and support strategic alignment across the consortium by highlighting synergies, complementarities, and opportunities for joint or individual exploitation actions. Beyond their reporting function, the tables represent an evidence base for the Final Business Plan and for future sustainability measures of the CREXDATA PaaS-System. An exemplary excerpt from the results is shown for KER TUC – 5 ‘EdgeToCloud Extension’ and TUC – 6 ‘Federated Learning Component’ in the following three tables. Due to the size of the tables, all further descriptions are presented in landscape format in the appendix.

Table 6: Exploitation description of TUC CREXDATA KERs I

Scientific research infrastructure									
Partner Name:	Technical University of Crete (TUC)								
Project Role:	research and development partner								
Target groups	Public institutions, Private individualsstart-up, Scientific community,								
Notes	-								
Key Exploitable Results									
ID	**Name of the Key Exploitable Result**	**Other involved partners**	**If yes, who?**	**Joint ownership**	**If yes, who?**	**Standalone Result**	**Integrated in Crexdata System**	**Intellectual Property Strategy**	**Type of Result (Algorithm/ Model/ Method/ Process/ Software/ Knowledge)**
TUC – 5	EdgeToCloud Extension	Yes	RapidMiner	No	No	Integrated into RM AI Studio	X	Open Source License AGPL3.0	Software: X
TUC – 6	Federated Learning Component	None	None	None	None	A standalone version of the component will be available.		The component will continue to be available as Open Source for researchers.	Algorithm: X, Software: X

Table 7: Exploitation description of TUC CREXDATA KERs II

Scientific research infrastructure								
Partner Name:	Technical University of Crete (TUC)							
Project Role:	research and development partner							
Target groups	Public institutions, Private individualsstart-up, Scientific community							
Notes	-							
Key Exploitable Results								
ID	**Exploitation Plan**	**Potential customers**	**Benefit to customers**	**Consultancy service/ Academic exploitation/ Commercial exploitation**	**Estimated maintenance cost**	**Estimated yearly selling price**	**Target group**	**Competitive advantage of the solution**
TUC – 5	distribute the EdgeToCloud Extenson free of charge via the RapidMiner Marketplace and to utilize it in future EU projects[1,2]	CREXDATA platform adopters	Extends CREXDATA over IoT topologies	Consultancy Service: X Academic Exploitation: X Commercial exploitation: no	No	No	Researchers, students, system integrators.	

[1] TUC created the EdgeToCloud Extension, which allows Federated Processing at IoT devices at the edge, as well as Federated Learning over federated topologies, and workflow optimization over such topologies. The extension significantly extended a prior RapidMiner extension (the Streaming Extension, originally developed by Altair RapidMiner), which provided support for executing workflows on Big Data clusters.
[2] Other partners that contributed to the Federated extension are:
- Altair RapidMiner, which migrated the Streaming Extension to the current version of RapidMiner AI Studio and RapidMiner AI Hub and developed and implemented a new extension for Kafka data stream handling.
- University of the Aegean which developed and implemented the Multi-Data Fusion Toolbox.
The involved CREXDATA partners intend to distribute the EdgeToCloud Extenson free of charge via the RapidMiner Marketplace and to utilize it in future EU projects.

TUC – 6	TUC intends to leverage this component as a research platform in upcoming EU projects, with the goal of progressively increasing its Technology Readiness Level (TRL) to level 7.[3]	Researchers, students, system integrators.	End-to-end low-communication Federated Learning with minimum development.	Academic Exploitation: As a research testbed for new FL techniques, as a teaching tool for graduate-level courses Commercial exploitation: N/A	N/A	N/A	Researchers, students, system integrators.	Low-cost deployment of Federated Learning process.

[3] The Federated Learning (FL) component, built on top of PyTorch and Flower, will be further developed to include more advanced and efficient FL algorithms and to support a wider range of hardware platforms. TUC intends to leverage this component as a research platform in upcoming EU projects, with the goal of progressively increasing its Technology Readiness Level (TRL) to level 7. Beyond its current focus on deep neural networks for computer vision and large language models (LLMs), the system will be extended to enable the training of Neural Radiance Fields (NeRFs) in federated environments. Additionally, the component will be expanded to support cross-device federated learning, integrating the auto-tuning techniques developed during the project.

Table 8: Exploitation description of TUC CREXDATA KERs III

Scientific research infrastructure							
Partner Name:	Technical University of Crete (TUC)						
Project Role:	research and development partner						
Target groups	Public institutions, Private individuals, start-up, Scientific community						
Notes	-						
Key Exploitable Results							
ID	**Technology Readiness Level (1-9)**	**Gaps until market readiness**	**Resources & budget requirements**	**Technical Risks & barriers**	**Code/ Solution commented?**	**Storage location of all data of the solution**	**Contact person**
TUC – 5	TRL-5	None	IoT network	None foreseen	Yes	CREXDATA Repository	Antonios Deligiannakis
TUC – 6	TRL-5	Adding new API besides the Kafka-based one.	Budget for development of planned extensions	None foreseen	Yes	CREXDATA git Repository	Vasilis Samoladas

These three tables have been created and approved for each partner. Research institutions and public institutions (BSC, CNR, Fraunhofer, NCSR, TUC, UA, URV, and UPB) focus on publications, open-source activities, and method generalization. Authorities and end users (FDDO, MoIFI, DCNA, DRZ, kpler, BSC and UPB) are responsible for evaluation, recommendation, and training, provide knowledge processes and network exchange, and promote practical transfer. Industry and product partners (HYDS, kpler and RM) focus on production integration, market differentiation, and the development of market strategies. Completed and detailed tables for each partner can be found in the appendix, an overview of all KERS by partners are in the following table 9:

Table 9: CREXDATA Key Exploitable Results

Partner	ID	Name of KER
BSC	BSC – 1	Relevance prediction model
	BSC – 2	User friendly simulator
	BSC – 3	Question answering tool
	BSC – 4	EpiSim.jl – High-performance epidemic simulator for metapopulation models
	BSC – 5	*episim-emews – HPC workflow for epidemic model calibration and uncertainty quantification*
	BSC – 6	episim-rl – Reinforcement learning workflow for adaptive epidemic intervention design
	BSC – 7	Multiscale Lung Infection Digital Twin Model
	BSC – 8	HPC Workflow for Multiscale Infection Simulation Execution
	BSC – 9	RapidMiner Workflow for Multiscale Infection Analysis
CNR	CNR – 1	Research products
	CNR – 2	Explanation methods for ML models to be deployed in time – sensitive scenarios
	CNR – 3	Pilot demonstrators
	CNR – 4	Models involving human expertise
DCNA	DCNA – 1	Report or summary of evaluations and tests; Guideline for use of technology
	DCNA – 2	Network (connections)
	DCNA – 3	Evaluation results / experience
	DCNA – 4	Evaluation methodologies
	DCNA – 5	Best-Practice Catalogue “Use Cases & KPIs”
	DCNA – 6	Stakeholder Onboarding & Governance Playbook
DRZ	DRZ – 1	Data inventory / overview
	DRZ – 2	Network (connections)
	DRZ – 3	Evaluation results / experience
	DRZ – 4	Evaluation methodologies
	DRZ – 5	Data
	DRZ – 6	Methodology to create 3D-models

	DRZ – 7	Training on 3D-model creation
FDDO	FDDO – 1	Report or summary of evaluations and tests; Guideline for use of technology
	FDDO – 2	Data inventory / overview
	FDDO – 3	Network (connections)
	FDDO – 4	Evaluation results / experience
	FDDO – 5	Data
FMI	FMI – 1	Development of FMI Gradient Boosting impact-based forecasts for rescue services in Finland.
	FMI – 2	Scientific publications
	FMI – 3	Utilize project technologies in Finland with stakeholders
	FMI – 4	Meteorological datasets
FR	FR – 1	Research products
MoIFI	MoIFI – 1	(Guidance on how to use products)
	MoIFI – 2	Open Source CREXDATA product
	MoIFI – 3	Utlilize project technologies in Finland with stakeholders
MT / kpler	Kpler – 1	Vessel Collision Detection and Avoidance
	Kpler – 2	Hazardous Weather Routing
	Kpler – 3	Multi-object Data Fusion
NCSR	NCSR – 1	Research papers
	NCSR – 2	Software prototypes for Complex Event Forecasting, Early Time-Series Classification and Optimization for Interactive Learning Workflows
	NCSR – 3	Software prototypes for Early Time-Series Classification
	NCSR – 4	Software prototypes for Optimization for Interactive Learning Workflows
RM	RM – 1	RapidMiner Extension for Kafka Data Streaming Handling
	RM – 2	RapidMiner Extension for FMI Forecast Integration
	RM – 3	RapidMiner Extension for Drone Data Integration
	RM – 4	RapidMiner Extension for HYDS ARGOS Integration
	RM – 5	RapidMiner Extension for BSC Health Emergency Simulator Integration
	RM – 6	RapidMiner Extension for FloodWaive Simulator Integration
	RM – 7	RapidMiner Extension for Gazebo Simulator Integration
	RM – 8	RapidMiner Extension for Kpler Maritime Simulator Integration
	RM – 9	RapidMiner Extension for Simulation HyperSuite Integration
	RM – 10	RapidMiner Extension for Complex Event Forecasting (CEF) Integration
	RM – 11	RapidMiner Extension for BSC Social Media Text Analytics Integration

	RM – 12	RapidMiner Extension for Explainable AI (XAI) Integration (LORE)
	RM – 13	RapidMiner Extension for NCSR Optimizer Integration
	RM – 14	RapidMiner Extension for Fraunhofer IAIS Visualization Integration
	RM – 15	CREXDATA Platform
TUC	TUC – 1	Consulting or customization afterwards to potential adopters
	TUC – 2	Real time explainability
	TUC – 3	CREXDATA Optimizer
	TUC – 4	AR Application
	TUC – 5	EdgeToCloud Extension
	TUC – 6	Federated Learning Component
UoA	UoA – 1	Scientific advancements in situational awareness
	UoA – 2	Multi-modal Data Fusion Toolbox
	UoA – 3	Multi-modal Data Fusion AI Studio Extension
UPB	UPB – 1	EmCase simulator HyperSuite in Altair RapidMiner
	UPB – 2	Methodology for Test-Oriented Resilient Requirements Engineering
	UPB – 3	Methodology for competence-based creation of future-robust business models
	UPB – 4	EmCase Robotic Simulator Software Code
	UPB – 5	EmCase Robotic Simulator Operator in Altair Rapid Miner
	UPB – 6	EmCase Flooding Simulation interface operator in Altair Rapid Miner
	UPB – 7	EmCase Simulator HyperSuite
	UPB – 8	EmCase Demonstrator System
	UPB – 9	EmCase Data Injector
	UPB – 10	EmCase Data Injector in Altair Rapid Miner
	UPB – 11	Uncertainty Model
URV	URV – 1	Scientific publications
	URV – 2	Pilot demonstrators
	URV – 3	Models involving human expertise
HYDS	HYDS – 1	Integration in ARGOS platform of other CREXDATA components

4.3 Megatrends and Innovation Field Analysis

Step four looks at the external perspective, which represents markets and external changes and is therefore fed into the model from the right. The five steps facilitate the derivation of future-robust BM, taking into account core competences, innovation fields and megatrends, as shown in Figure 24.

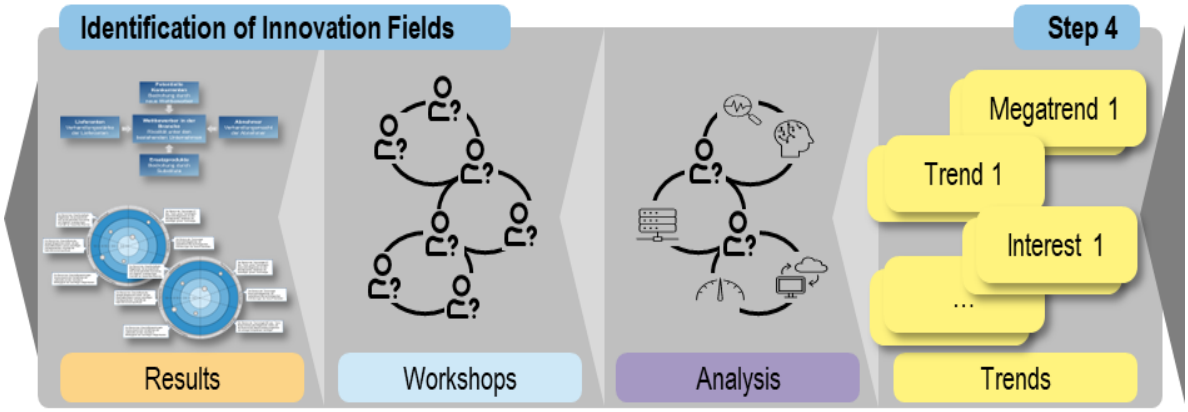

Figure 24: Identification of Innovation Fields

4.3.1 Megatrends

The analysis of global megatrends is central to understanding the long-term impact on the project, positioning, and exploitation strategy. Megatrends shape technological, economic, and social developments and form the framework within which CREXDATA operates. In the project context, they are interpreted in concrete terms to determine relevance, implications, and operational effects (opportunities, risks, market potential, technological changes). Figure 25 visualizes the relevant megatrends and their potential influences.

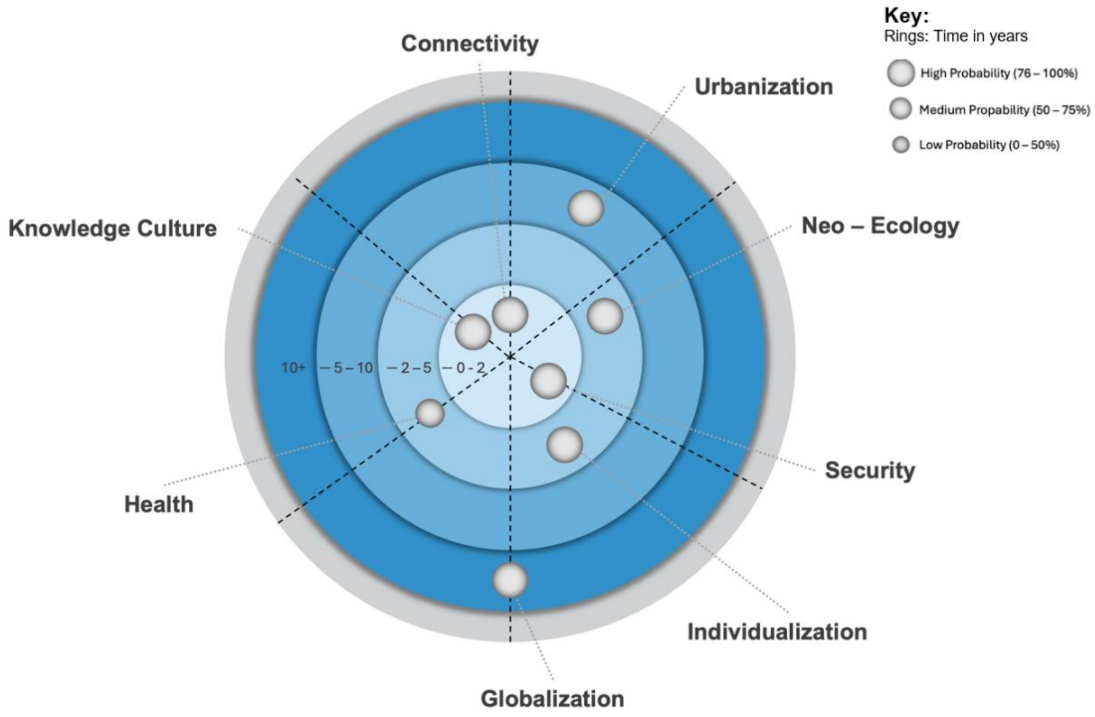

Figure 25: CREXDATA relevant megatrends

Connectivity:
Increasingly networked data sources and systems are shaping the digital transformation. CREXDATA addresses this by integrating and analysing real-time data sources and incorporating IoT applications. This increases the need for platforms that link heterogeneous data sources and integrate ecosystems (such as smart cities or Copernicus services).

Security:
Disaster control, risk management, and decision support in critical situations are core areas of CREXDATA. Robust early warning and decision-making systems create competitive advantages in security-related applications for public and private actors.

Urbanization:
Growing demands on urban infrastructures increase the need for smart city solutions. CREXDATA supports emergency planning, infrastructure protection, and disaster management through data-based approaches, thereby strengthening the resilience of urban systems.

Health:
Global health crises, such as pandemics, highlight the value of rapid, data-driven decisions. CREXDATA can merge medical, logistical, and geospatial data in real time to support detection, analysis, and coordination in crises.

Globalization:
Challenges such as climate change, health crises, and natural disasters require cross-border cooperation. CREXDATA is designed for scalable, transnational solutions and can be integrated into European and international networks.

Neo-ecology:
Sustainability and climate change are key drivers of innovation. CREXDATA develops tools for climate risk management, ecological risk analysis, and sustainable decision support systems (including extreme weather modelling), thereby supporting climate adaptation strategies.

Knowledge culture:
A data-driven society needs accessible, visually understandable information. CREXDATA promotes data-based decisions through visualizations, real-time dashboards, and AR applications, strengthening the acceptance of digital decision support.

Individualization:
Different stakeholders, such as public authorities, companies, or emergency services, require tailor-made data solutions. CREXDATA responds with modular, flexible platform architectures that enable individual customization and open new market segments.

4.3.2 Identified fields of innovation

Areas of innovation are topics or fields of application in which targeted activities for the development of new products, services, technologies, or processes take place. Companies, research institutions, and public institutions, such as governments, identify such fields in order to effectively direct investments and resources to promising areas for the future. The systematic pooling of knowledge, skills, and financial resources sustainably strengthens innovative capacity and increases the competitiveness of organizations and business models.

The CREXDATA business model is being further developed so that the solutions emerging from the project can have an impact in various fields of innovation and create economic and

social added value. Megatrends are of considerable importance here, as they influence the direction of the commercialization strategy. In chapter 3 of deliverable D6.2, four key areas of innovation in particular were highlighted as potential future areas of application beyond the three original use cases:

- Smart cities: Flood/Wildfire management, traffic optimisation, emergency response
- Smart factories: Asset-Monitoring, Risk-Simulation, Predictive Maintenance
- Smart Grids: Multi-Hazard-Analyses, Nowcasting, Data-Driven Weather Impact.
- Maritime Logistics: Route optimisation, collision avoidance, risk heat maps

These fields of innovation illustrate the technological and social contexts in which the solutions developed in the project can be applied in the long term and generate added value.

4.4 Market trends and target industry

Based on the megatrends identified in section 4.3.1 we looked at current and future developments that are relevant to CREXDATA´s strategic positioning. Trends influence technological innovation, market entry, customer requirements, and competitive pressure. Accordingly, it is important to continuously expand technological capabilities, strengthen existing partnerships, and make targeted use of market opportunities.

The market analysis underscores the need for ongoing investment in AI, security, and sustainable technologies. Priority is given to improving data processing through adaptive algorithms and further developing simulation technologies for mapping complex processes. These advances form the basis for further developing CREXDATA as a powerful, future-oriented platform. A strengthened technological base, the expansion of strategic partnerships, and the implementation of pilot projects and use cases are crucial for successful market positioning. At the same time, market communication and branding should increase visibility and trust in the platform. A focused sales strategy accelerates market entry and supports scaling into new areas of application. CREXDATA can thus position itself as the leading European platform for predictive crisis management. A SWOT analysis is used for a structured evaluation. It combines the internal perspective (strengths/weaknesses) with external factors (opportunities/risks) and serves as a basis for strategic decision-making. The analysis shows that CREXDATA has a very strong technological foundation but faces challenges in commercialization and long-term scaling.

The technological orientation in CREXDATA supports this strategy. Open interfaces and interoperability (API-first architecture, plug-and-play modules, support for open data standards) facilitate integration and expandability. The modular microservice architecture enables flexible, cross-industry adaptation (including healthcare, environmental monitoring, smart cities) and rapid updates. Data protection and security concepts with federated machine learning (distributing data), explainable AI, and end-to-end security. The expanded SWOT matrix with a focus on KERs, technological strengths and weaknesses, and strategic priorities is in the appendix, a short overview is given in Figure 26.

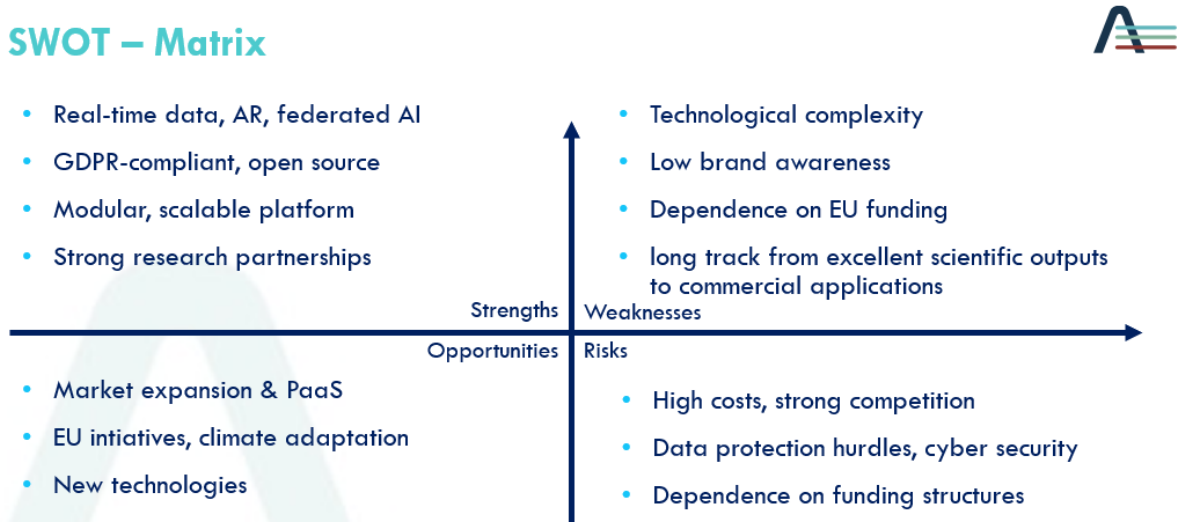

Figure 26: CREXDATA SWOT Matrix

4.5 CREXDATA Innovations

Three of the innovations were already reported in the midterm report and have since been further consolidated. Four additional innovations emerged during the second project phase and were systematically integrated into the exploitation strategy.

- Federated Learning under bandwidth constraints
- A platform for epidemic simulations
- Complex Event Recognition with Symbolic Register Transducers
- Augmented Reality toolkit for critical action (flood, fire, maritime) environments
- Multi-Modal Data Fusion Toolbox
- Edge-To-Cloud extension for graphically specifying streaming workflows over edge to cloud settings
- Optimizer for edge to cloud Processing

Based on the continuous assessment conducted through the CREXDATA Innovation Radar, exploitation activities were systematically focused and advanced for seven key innovations, taking into account their maturity, relevance for validated use cases, and the heterogeneous framework conditions of the consortium. Exploitation planning followed a coherent EU project logic, ensuring alignment with Horizon Europe objectives, partner-specific mandates, and sustainability beyond the project lifetime.

For the innovations already reported at midterm, exploitation efforts were consolidated and refined. Federated Learning under bandwidth constraints was positioned as an enabling technology for streaming analytics in infrastructure-limited and poored environments. Exploitation activities focused on validating the approach in representative use cases, aligning it with partners interested in edge analytics and data sovereignty, and defining a clear pathway towards integration into existing platforms rather than standalone commercialisation. This ensured compliance with consortium data governance requirements while maximising reuse potential.

The platform for epidemic simulations was further exploited as a modular decision-support and scenario-analysis framework for public-sector stakeholders and research organisations. Exploitation activities prioritised configurability, transparency of modelling assumptions, and scientific reproducibility. Given the consortium, sustainability was primarily addressed

through institutional uptake, open access to core components, and long-term research reuse, rather than exclusive commercial exploitation.

Complex Event Recognition based on Symbolic Register Transducers was exploited as a core analytical capability for high-level situation awareness in streaming data environments. Exploitation focused on embedding this functionality into broader CREXDATA workflow and streaming infrastructures, targeting expert users in domains such as smart cities, industrial monitoring, and crisis management. A clear separation between generic methods and domain-specific configurations ensured that partners could exploit the technology while respecting confidentiality and IPR constraints.

In addition, four new innovations were integrated into the exploitation strategy during the second project phase. The Augmented Reality toolkit for critical action environments (flood, fire, and maritime scenarios) was driven by strong end-user demand. Exploitation activities concentrated on operational validation, modular integration into existing command-and-control systems, and service-oriented exploitation paths such as training and decision-support, explicitly positioning the toolkit as a support instrument rather than an autonomous system.

The Multi-Modal Data Fusion Toolbox was exploited as a horizontal enabler across multiple use cases and innovations. Activities focused on defining interoperable interfaces for heterogeneous data sources and ensuring compatibility with existing analytics pipelines, thereby maximising adoption potential within and beyond the consortium.

The EdgeToCloud extension for graphical specification of streaming workflows, together with the Optimizer for Edge to Cloud Processing, was exploited as a strategic foundation for end-to-end edge-to-cloud data processing. Exploitation emphasised usability, interoperability, and demonstrable efficiency gains, while ensuring transparency and explainability in optimisation decisions. Together, these innovations strengthen CREXDATA's overall exploitation portfolio and provide a coherent basis for sustainable post-project impact.

4.6 Business Model Development

The further development of the Business Model Canvas builds on the KERs and the Value Proposition Canvas analysis. The focus is on developing a market-oriented and scalable platform strategy. The vision is to improve crisis management through predictive, real-time, data-driven decisions. The mission focuses on the development of scalable, explainable, and secure technology. Long-term goals are scalability, interoperability, sustainability, and market integration of the platform. The key unique selling points (USPs) are federated machine learning, a modular architecture, the integration of augmented reality (AR) for decision support, the use of explainable AI (XAI) and visual analytics. These features are particularly relevant to the customer segments of public administration and authorities, fire and rescue services, research, industry and technology companies, as well as the maritime and logistics sectors.

The BM serves as a link between value creation and value generation in the target market. In the fifth step, all information is used to create a future-robust BM (Figure 27). A BM is created when core competences, KERs and key technologies are combined with megatrends and innovation fields. The first step is to analyse internal strengths: What competences and technologies does the consortium possess that are unique and difficult to imitate? At the same time, external drivers such as social megatrends (e.g. sustainability, digitalization) and innovation fields (e.g. artificial intelligence, electromobility) are identified. By combining both perspectives (right-hand side, steps one to three and left-hand side, step

four), innovative value propositions can be developed. Key technologies are utilized to create products or services that are tailored to the needs of future markets. The focus on megatrends ensures long-term relevance, while focusing on areas of innovation helps to deploy resources in a targeted manner.

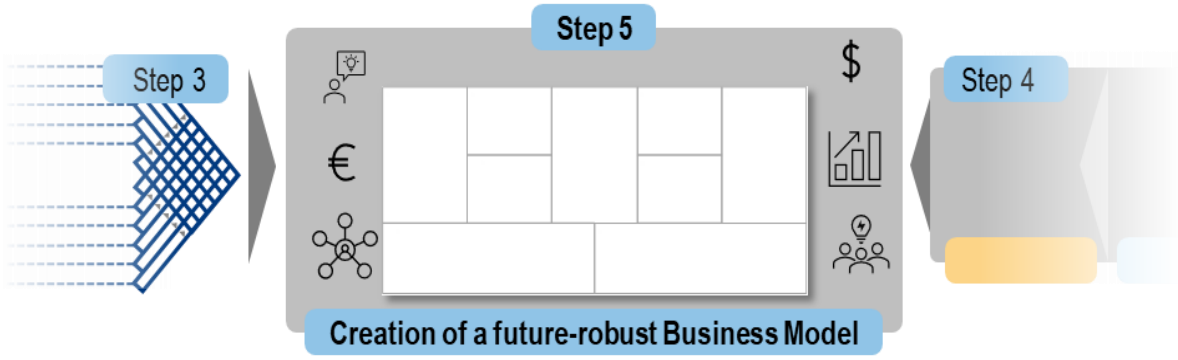

Figure 27: Creation of future-robust Business Models

Based on the analysis in D6.2, the value propositions were transferred to the Business Model Canvas (BMC). This reveals different value propositions for each segment. For authorities and emergency services, the focus is on real-time situation reports and predictive warnings (flood, robotic and fire simulations, FMI forecasts, BSC models, AR support on site). In the maritime sector, the focus is on hazardous weather routing and collision avoidance. Research institutions and universities benefit from open access publications, prototypes, and reproducibility, while industry and technology partners use integration interfaces and data fusion technologies. In terms of customer benefits, the focus is on rapid situation assessment, high compliance, and interoperability. Federated data processing and XAI mechanisms act as pain relievers, while AR-supported visualizations noticeably simplify decision-making.

The offering structure will be divided into several product lines. At its heart is the core platform, which offers functions for data integration, federated analysis, XAI, and visual representation in dashboards. Building on this, domain packages are developed:

- Crisis Response: for authorities and fire departments (FMI forecasts, AR modules)
- Maritime Safety: for the maritime sector (routing and collision avoidance)
- Urban Resilience: for smart city integrations

This is supplemented by extensions and connectors for data streaming, ARGOS integration, multi-modal data fusion, and simulators. In addition, services such as training, operational support, custom solutions, and data services are provided.

Market entry is via pilot projects and partner networks (Helsinki (FI), Dortmund (DE), Innsbruck (AT)) and is being scaled via ARGOS (ESP), RapidMiner Marketplace (DE), research consortia, and conferences. Communication emphasizes data protection, transparency, and explainability (XAI and AR) and positions CREXDATA as an "EU-trusted" solution.

As part of this report, a competitive analysis was conducted in which a comparison was made with (in)direct competitors. In comparison with Business Analytics institutes, it became clear that CREXDATA specializes in crisis management and real-time responses, while Business Analytics institutes are more focused on business analytics. In contrast to IoT platforms, the focus is not only on industrial applications, but also on disaster and crisis

management. Compared to Copernicus services, CREXDATA combines different data sources such as satellite data, IoT, and historical data to optimize crisis decisions. There is also a clear distinction compared to technology companies with AR solutions, as CREXDATA uses AR specifically to simplify crisis management. Compared to software and consulting firms focusing on sustainability and climate risks, CREXDATA's focus is on predictive crisis management in real time. The analysis thus confirms the technology focus on AI, real-time analysis, data fusion, predictive models, and AR. The unique selling point lies in real-time decision support through federated data analysis and AI technologies. CREXDATA differentiates itself from comparable offerings through its focus on crisis and disaster management and the targeted use of AR to support operations.

The KERs are used to derive technological levels for the development of the business model: data and analysis level (complex event forecasting, federated ML, distributed analytics, text mining), decision level (explainable AI, visual analytics, decision support under uncertainty), interface level (AR visualization, uncertainty visualization in AR, field collaboration). Accordingly, public authorities benefit from early warning systems and situation reports, the maritime sector from routing and collision avoidance, research from open access and XAI, and industry and technology from integration interfaces and data fusion. Figure 28 illustrates a small excerpt from BMC of CREXDATA.

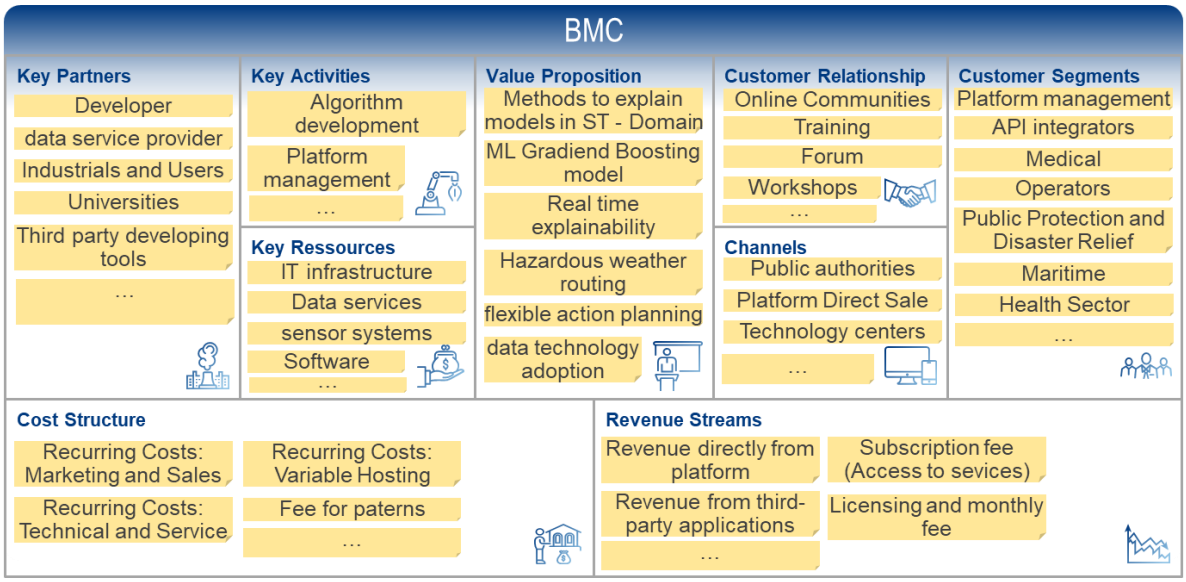

Figure 28: Small excerpt from the CREXDATA BMC (initial version in D6.2),

The key partners (RM, HYDS, DRZ, DCNA, FMI, CNR, Kpler, TUC, UPB) shape the key activities (product development, integration, training, piloting) and provide the key resources (technology platform, partner expertise, infrastructure). The value proposition includes early warning systems, real-time situational maps, explainable AI, and AR. The customer segments include public authorities, emergency services, research, industry, and maritime stakeholders. Channels are ARGOS, the RapidMiner Marketplace, research consortia, and pilot regions. Customer relationships are established through cooperation, training, and service level agreements. The cost structure includes R&D, cloud, support, compliance, and training. Revenue streams consist of SaaS revenue, services, open source and enterprise models, and public maintenance fees.

The most important key partners and their roles are derived from the exploitation plans. RM acts as a technology integrator, while HYDS is responsible for ARGOS System integration and visualization. FMI and MoIFI provide meteorological data and workflows, and Kpler

supplies maritime data and applications. DRZ, DCNA, and FDDO are responsible for validation and training, while CNR, Fraunhofer, URV, UoA, and BSC contribute research and XAI expertise. Commercialization axes are emerging between RM and HYDS, TUC and industry, and FMI, MoIFI, and public authorities.

Key activities include roadmap updates, TRL enhancement of KERs, data partnerships, and ensuring compliance. In addition, there is the productization of XAI and AR solutions and the establishment of an integration ecosystem (APIs, SDKs, documentation, demos). Necessary resources include cloud and edge infrastructures, security and DevOps expertise, data engineering, AR/front-end development, and customer success management. The IP and licensing model combines open-source components (TUC, NCSR, UPB, RM extensions) with proprietary enterprise modules. Data governance is governed by clear roles and rights concepts as well as audit trails to ensure data usage transparency.

Operations provide for service level agreements for availability and real-time capability. A structured onboarding path leads from sandbox to pilot to production and is supported by migration guides, training, playbooks, and practice scenarios. Risks lie in scalability, edge operations, data quality, AI transparency, and subsidy dependency.

Edge computing, quality-of-service measures and diversification of revenue sources through SaaS and service packages are used for security. Success is measured using defined KPIs. Time-to-alert, forecast accuracy, and AR usage rate are relevant for the product. In the go-to-market context, metrics such as pilot-to-productive conversion rate and user acquisition are used. At the impact level, reduced deployment times, damage mitigation, and user satisfaction are evaluated.

4.7 Final Business Plan

Based on the continuous assessment conducted through the CREXDATA Innovation Radar, exploitation and business planning activities were systematically aligned and advanced for seven key innovations, taking into account their maturity, relevance for validated use cases, and the heterogeneous framework conditions of the consortium. The resulting action plan addresses responses to competitive pressure, the further development of Key Exploitation Results (KERs), the positioning of CREXDATA in terms of its unique selling points (USPs), and strategic recommendations for future development in line with Horizon Europe impact objectives. A central element of the business plan is the positioning of CREXDATA as a European Platform-as-a-Service (PaaS) for data-intensive, edge-to-cloud and AI-driven applications. To this end, strategic partnerships with research institutions and public authorities are to be continuously strengthened, reflecting the strong public-sector orientation of several use cases and the consortium structure. Exploitation activities therefore focus on application-oriented KERs with clear uptake potential, in particular in the areas of augmented reality visualisation, federated AI, and data streaming and processing.

The seven CREXDATA innovations that were prioritised and further developed comprise: Federated Learning under bandwidth constraints; a platform for epidemic simulations; Complex Event Recognition based on Symbolic Register Transducers; an Augmented Reality toolkit for critical action environments (flood, fire, and maritime); a Multi-Modal Data Fusion Toolbox; an EdgeToCloud extension for graphically specifying streaming workflows across edge and cloud infrastructures; and an Optimizer for Edge to Cloud Processing. Together, these innovations form a coherent and complementary portfolio that underpins CREXDATA's technological differentiation. For Federated Learning under bandwidth constraints, exploitation and business planning emphasise privacy-preserving and resource-efficient analytics as a core USP, particularly relevant for regulated and infrastructure-limited

environments. The epidemic simulation platform is positioned as a modular decision-support and scenario-analysis framework for public authorities and research organisations, supporting institutional adoption and long-term sustainability. Complex Event Recognition with Symbolic Register Transducers strengthens CREXDATA's real-time analytics capabilities and is exploited through integration into streaming workflows and situation-awareness applications. The Augmented Reality toolkit addresses operational needs in critical action environments and represents a highly application-oriented KER, supporting service-based exploitation models such as training, simulation, and operational decision support. The Multi-Modal Data Fusion Toolbox acts as a horizontal enabler across use cases, increasing the overall value proposition of the CREXDATA platform. The EdgeToCloud extension and the Optimizer for Edge to Cloud Processing jointly support efficient end-to-end data processing and orchestration, reinforcing CREXDATA's competitiveness in edge-to-cloud settings. Strategic recommendations foresee the continuous development of AI and AR components and the targeted expansion of partnerships with key actors from research and public administration. Measures are structured along short-, medium-, and long-term horizons: short-term measures cover activities implemented during the project period; medium-term measures address consolidation and uptake within a defined post-project timeframe; and long-term measures focus on the strategic evolution of CREXDATA beyond the project duration, with the ambition to strengthen market positioning and technological leadership at European level..

4.7.1 Short-term measures

Short-term measures include all activities that should be implemented during the project period or have already been implemented. The aim of these measures is to prepare for a successful market entry by positioning CREXDATA as a European platform for predictive crisis management. This includes securing the technological foundations and establishing initial partnerships with COLLARIS2 and MePreCiSa.

A key focus is on further technological development. AI and the automation of the self-learning predictive model are to be further optimized, as is algorithm control. In addition, the expansion of edge computing for local real-time data processing is being driven forward, while existing cybersecurity standards are being further improved.

The implementation of initial pilot applications with public authorities and municipal actors, such as smart cities, disaster control, and healthcare, will be intensified and documented. This will enable potential and risks to be identified, evaluated, and adjusted at an early stage. Test runs with potential end users, such as public authorities, NGOs, and companies, will be continued and evaluated. The insights gained will be shared in technical articles and at industry conferences to increase CREXDATA's visibility and strengthen its positioning. These measures form the basis for a successful and sustainable market entry.

4.7.2 Medium-term measures

Medium-term goals relate to scaling the platform, building a sustainable market structure, and establishing strategic alliances. A key component is the introduction of a SaaS model for public authorities and companies, which enables flexible use of the platform as a cloud solution. At the same time, expansion into European and international markets is being driven forward, particularly in the areas of smart cities, environmental analysis, and healthcare.

The establishment of partnerships with sustainable technology providers is intended to consolidate CREXDATA's position in the market. At the same time, closer cooperation with universities, research institutions, and governments is being sought in order to promote the integration of the existing platform into various fields of application. The sustainability

strategy includes the implementation of CO2 reduction and climate risk management initiatives. Technological enhancements also play a role, with digital twins to be used to simulate complex scenarios in order to further improve forecasts and decision-making processes. In addition, novel technologies such as quantum computing and biotech trends can be used for data-intensive analyses to further increase the platform's performance.

4.8 Cooperation and sustainability strategy

4.8.1 Establishment, maintenance of partner networks & ecosystems

CREXDATA is based on a strong European partner network from research, industry, and public institutions with the aim of establishing and sustaining a European ecosystem for the long-term use and further development of the project results. The partners play different but important roles in this:

- Research partners (CNR, Fraunhofer, URV, UoA, UPB, BSC): basic research, application-oriented research, explainable AI, and open access
- Technology partners (RM, HYDS, Kpler, FMI, TUC, NCSR): development of specific tools, data fusion, AR and ML components
- Users (FDDO, DRZ, DCNA, MoIFI): validation, training, practical experience, and feedback

One focus is on building strategic alliances with industry, government agencies, and research institutions to create synergies in the development, application, and scaling of technologies.

Community building through networks such as DCNA, DRZ, UoA, and MoIFI serves to facilitate exchange, knowledge transfer, and training for users. The use of the ARGOS and RapidMiner Marketplace platforms promotes networking, visibility, and the sharing of results.

To further consolidate these efforts, a CREXDATA partner network is being developed to support the coordination of joint projects and the harmonization of exploitation strategies between the various players. Long-term cooperation with European research clusters, particularly within the framework of Horizon Europe, plays a central role in ensuring knowledge transfer and connectivity to existing research initiatives.

Another goal is to promote an open innovation ecosystem through workshops, data exchange platforms, and common standards to enable transparency, interoperability, and sustainable cooperation.

The focus is on bilateral exploitation axes and the development of cooperation models with public authorities to support the market launch, scaling, and long-term establishment of CREXDATA. The establishment of strategic alliances with industry, public authorities, and research institutions thus forms a central cornerstone for the sustainability and competitiveness of the project.

4.8.2 Potential for follow-up projects & funding programs

CREXDATA offers great potential for further use after the end of the project. A key prospect is participation in EU follow-up programs in order to further develop the approaches developed in the project in a targeted manner and transfer them to new fields of application. CREXDATA can serve as the scientific and technological basis for future EU initiatives in the areas of sustainability, AI transparency, and crisis prevention.

Another focus is on using existing EU networks to promote cross-border cooperation, for example in smart city and environmental programs. In addition, long-term international

cooperation with organizations is being sought to ensure the global applicability of the technologies and models developed.

In addition to public funding, follow-up financing through public funds or industrial cooperation is also being examined to ensure sustainable implementation and market readiness. Furthermore, CREXDATA can be integrated into the national security and resilience programs of the member states to strengthen Europe's capacity to act in the areas of crisis management and data analysis.

4.8.3 Standardization, open-source strategies, and dissemination of results

CREXDATA pursues a combined approach of open-source components and enterprise modules to promote innovation, transparency, and reusability in equal measure. Central to this is the publication of key project results as open-source components to enable broad use and further development by the community. The Multi-Modal Data Fusion Toolbox is a core project result alongside the various RapidMiner extensions. The CREXDATA extensions are available free of charge via the RapidMiner Marketplace and in the CREXDATA GitHub repository.

The system architecture has been implemented into various extensions. Key results were incorporated into various RapidMiner Custom Extensions, examples of which include the EmCase Simulator HyperSuite Extension and the EmCase Operator Extension. The CREXDATA Simulator HyperSuite Extension comprises various custom operators based on the defined workflows. The CREXDATA extension offers a simple and intuitive level of abstraction for using the various simulators. In figure 29, the CREXDATA Simulator HyperSuite Custom Extension is shown in a RapidMiner AI Studio screenshot. Various extensions (folders (.jar files)) can be seen in the figure 29. The EmCase operators include, for example, the various technologies from WP4 and WP5, like Text Mining, Biometric Data, and Fatigue Assessment. The three EmCase simulators and the Data Injector are embedded in the 'EmCase Simulator HyperSuite' custom extension. The operators shown in the extension include executable simulators and underlying workflows. The various operators from the custom extensions can be executed in RapidMiner AI Studio (on the desktop or notebook) and on the RapidMiner AI Hub (server).

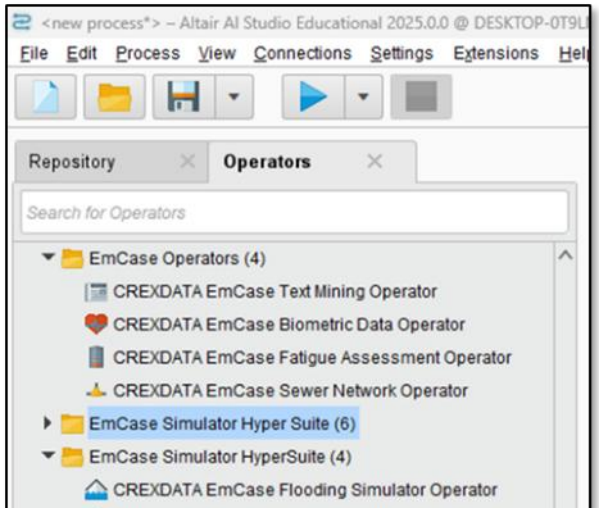

Figure 29: Extensions in RapidMiner AI Studio (here: EmCase operators, see D2.3)

Figure 30: Extensions in RapidMiner AI Studio (here: EmCase operators, see D2.3)

Reuse is promoted through open interfaces (APIs) and an architecture that ensures modularity, interoperability, and scalability. Open standards are pursued, in particular an API-first approach and compatibility with IoT systems and Copernicus data infrastructures, to facilitate integration into existing European platforms and data spaces.

Another focus is on promoting open science principles, including open access publications, open data, and training courses for knowledge transfer. These measures help to increase scientific visibility and ensure the reproducibility of research results. In addition, project results are systematically documented and transferred to European standardization

processes to ensure long-term integration into EU guidelines and expert committees.

Standardization is supported in particular by policy and guideline work in EU bodies to enable uniform and quality-assured use of the results. The use of GDPR-compliant mechanisms serves as a benchmark for future European standards in the field of data management and AI-based decision support.

The aim of the CREXDATA approach is to promote knowledge exchange, transparency, and sustainable reuse through freely available tools, open publications, and accessible repositories that enable the further development of project results in research, industry, and administration.

In line with Horizon Europe principles on openness, reuse, and sustainability, all CREXDATA innovations and associated Key Exploitation Results are made available as open-source components under clearly defined licensing models. The chosen licensing approach balances openness with legal clarity and long-term maintainability, enabling reuse by research institutions, public authorities, and industrial stakeholders while respecting consortium-specific IPR arrangements. Open-source availability supports transparency, fosters community-driven innovation, and lowers barriers to adoption, while the underlying license model allows partners to build complementary services, extensions, and application-specific solutions on top of the CREXDATA results. This approach ensures wide dissemination and uptake of project outcomes while providing a sustainable foundation for post-project exploitation. All results can be found on the GIT and the Project Website.

GIT: https://github.com/altairengineering/crexdata-public

Website: https://crexdata.eu/

4.8.4 Exploitation of CREXDATA results in training services

The Deutsches Rettungsrobotik Zentrum (DRZ) exploits results from CREXDATA by incorporating project knowledge into its operational training services for civil protection stakeholders. Specifically, insights related to UAV mapping and 3D model generation, using NeRF (Neural Radiance Fields) with Federated Learning developed in CREXDATA are being embedded into the DRZ training programme. A new training module, “DRZ-M014 | Effiziente Kartierung und Lageerkundung im BOS-Einsatz mit WebODM”, has been added to the DRZ course catalogue. A unit included in this course will introduce learners to cutting-edge developments from CREXDATA, including NeRF-based 3D modelling workflows to support situational awareness and decision-making during emergencies. Both technical potential and current limitations, as experienced in CREXDATA trials, will be discussed, offering a forward-looking view on future applications.

During the project, a first prototype of this exploitation was tested through a hands-on training session with UAV specialists from the “Fernmeldezug” (communications unit) of FDDO, focusing on the generation and operational use of 3D models. In the final project months, DRZ is preparing the training concept and content, including training the trainers, to support continued knowledge transfer beyond the project. Post-project, DRZ anticipates reaching up to ten client organisations per year (e.g. civil protection agencies, fire/USAR units, system integrators), generating an estimated annual service value of ~€20,000. This pathway ensures sustainable exploitation of CREXDATA knowledge through capacity building in real-world emergency response operations.

4.8.5 Exploitation of CREXDATA results by RapidMiner

Within the CREXDATA project, RapidMiner extended the Altair RapidMiner platform for the CREXDATA project by several extensions for data integration and system integration (e.g. for Kafka data stream handling, FMI weather forecast and wave height forecast integration,

drone data integration, and for integrating CREXDATA system components like the HYDS ARGOS system, the BSC simulator for the health emergency use case, the FloodWaive DeepWaive simulator and the Gazebo simulator for the weather emergency use case, the Keplr simulator for maritime use case, the LORE eXplainable Artificial Intelligence (XAI) component, etc.), which widens the applicability of the Altair RapidMiner platform to new use cases and application domains, which will enable RapidMiner to enter new markets and to grow the number of users of the Altair RapidMiner platform. While these extensions are made available free of charge via the RapidMiner Marketplace, they require the underlying Altair RapidMiner platform to work and hence generate new platform license customers for RapidMiner for the products Altair RapidMiner AI Studio (desktop), Altair RapidMiner AI Hub (server), and the Altair RapidMiner Real-Time Scoring Agents (RTSA) (edge), which will lead to additional revenue for RapidMiner. Additional revenue may be generated by related services like consulting, training, system integration and configuration, and hosting of the platform, if this is preferred by the customer.

4.8.6 Sustainable use of scientific and economic results

The scientific sustainability of CREXDATA is ensured by continuing research in the fields of Artificial Intelligence (AI), Augmented Reality (AR), federated systems, and sustainability. The results of the project are further developed through publications, follow-up projects, and doctoral theses, thus remaining scientifically available and compatible. In addition, the project results will be integrated into teaching and training, for example at universities and research institutions, in order to strengthen knowledge transfer and promote young talents. In this way, CREXDATA contributes to scientific excellence and the dissemination of knowledge in Europe in the long term. Economic sustainability is promoted by the transition from a research platform to a commercial SaaS solution. This includes the development of marketable products and services, for example through software-as-a-service offerings, licensing models, or consulting services. The use of the platform as a basis for new data-driven business models creates additional economic potential. In addition, the pilots developed in the project serve as references for market entry and the expansion of strategic partnerships with industry and public authorities to enable long-term financing and scaling. The social added value of CREXDATA is evident in several dimensions: The project contributes to the EU's goals in the areas of resilience, sustainability, and digitization and strengthens the security and decision-making capabilities of public institutions. Through the use of data-driven technologies, CREXDATA contributes to the promotion of a European data and knowledge culture, public acceptance of digital technologies, and the strengthening of European sovereignty in crisis management. In this way, CREXDATA supports the digitalization of public services and promotes social resilience, sustainability, and security in Europe.

4.9 Summary and outlook for T6.2

The updated exploitation strategy clearly defines the transition from the research phase to market-oriented use. New Key Exploitation Results (KERs) illustrate the increased maturity and application-oriented further development of the technologies. The value proposition has been sharpened and more closely aligned with real user needs. The business model integrates research, technology, application, and market in a scalable ecosystem. CREXDATA addresses key future topics such as explainable AI, real-time decision support, federated data processing, and AR-based visualization, positioning itself as a pioneer in these areas. The business model ensures sustainability through a dual structure consisting

of open-source components (research and innovation) and commercial SaaS models (market). The close involvement of partners and stakeholders creates a long-term value chain. Scientific sustainability is ensured through publications, teaching, and follow-up projects. Economic sustainability results from the scalable, modular platform model with clearly defined revenue streams. The social added value lies in strengthening European sovereignty in data and crisis management. In the future, expansion into new sectors such as environmental analytics, smart cities, healthcare, and disaster management is possible. Follow-up opportunities arise in particular through EU programs and national security initiatives. The expansion of international cooperation is also planned. In the long term, the platform is to be further developed into a European standard for AI-based crisis management solutions. The overarching vision is to establish CREXDATA as an interoperable, open data hub for resilience, sustainability, and security in Europe.

5 Key Performance Indicators

All dissemination and industry engagement activities are carefully monitored. The following table summarises the Key Performance Indicators (KPIs) that will help ensure the impact of the dissemination activities. They will be monitored frequently and revised yearly, as they might change or evolve based on the project progress.

Table 10: Key Performance Indicators

Activity	Measure	Final status (M36)
Project branding and identity	1 project logo, 1 project website, 1 project overview poster, 1 promotional flyer	**Met**
Web 2.0/social media	Number of X (Twitter) followers 200	**85**
	Number of LinkedIn followers 100	**259**
	YouTube video uploads 2	**22**
	YouTube video subscribers 50	**33**
Event-base dissemination	2 industrial workshops	**3**
	1 scientific workshop	**6**
	5 keynotes/tutorial talks	**5**
	Participation in 2 fairs or exhibits in 2 events	**7**
	2 demo papers in top-tier industry conferences	**6**
Research/academic dissemination	6-8 publications in top-tier journals	**24**
	20 academic conferences	**33**
	5 PhD/Master thesis	**10**
Collaboration with other EU Projects	Sign MoU with 2 projects, share data with 2 projects, co-organize industrial and scientific workshops with 2 projects	**Met**
Transform research efforts into business value	Whitepaper 2	**0**

In the original description of action (DoA) we expected to have more X (Twitter) followers per year, but we have seen that the community is more engaged through LinkedIn. Furthermore, due to the instability of X, we believed that more effort needed to be put into growing the LinkedIn community and that X should be a secondary platform.

6 Appendix

6.1 Appendix 1 – CREXDATA Events (M19-M36)

Table 11: CREXDATA Events

CREXDATA Dissemination Register- Horizon Europe Reporting (M19-M36)		
Partner	**Activity**	**Start date DD/MM/YY**
UPB	Presentation "Anwendungspotenziale von Künstlicher Intelligenz im Model-Based Systems Engineering für automatisierte Systeme" at Automation 2024	2/7/2024
NCSR	Course at ACM Summer School	12/7/2024
BSC	Flyer at "La Nit de La Recerca", Citizen Engagement Event	30/7/2024
NCSR	Presentation in a conference"Complex Event Recognition with Symbolic Register Transducers"	26/8/2024
UPB	Presentation at "Extending the application of simulation from preparedness to response use cases in weather-induced emergencies" at Mench und Computer 2024	1/9/2024
	Web news: CREXDATA Hosts Successful 6th Plenary Meeting Virtually	12/9/2024
UPB	Presentation "Quality Key Figures for Developing Future Scenarios" at IHSED conference	22/9/2024
UPB, TUC	Session at EBDVF 2024	2/10/2024
DRZ	Poster Presentation at the Brandweerevent 2024	16/10/2024
UPB	Conference presentation "Model-based planning of test cases and test scenarios to support engineering of Cyber-Physical Systems" at ISSE	16/10/2024
Kpler	Demo at WUWNET'24	28/10/2024
	Web news: CREXDATA at WUWNet'24: Showcasing Vessel Collision Detection and Avoidance Systems	31/10/2024
BSC	Presentation at the Smart City Expo 2024	5/11/2024
	Web news: Addressing Climate-Induced Disasters with Advanced Data Solutions: Lessons from Valencia Floods	8/11/2024
TUC	Presentation at the 28th International Conference on Extending Database Technology (EDBT)	11/11/2024
BSC, URV	Web news: Open-Source Epidemic Simulations with Epi-Sim and CREXDATA	16/1/2025
NCSR	Presentation at Thirty-Ninth AAAI Conference on Artificial Intelligence "Temporal Specification Optimisation for the Event Calculus"	25/2/2025
BSC	Presentation at 4YFN, MWC25	5/3/2025
Kpler	Demo paper presentation at EDBT 2025	26/3/2025
UPB	Presentation "Method for systematic creation of test scenarios for early customer involvement" at CIRP Design 2025	2/4/2025
	Web news: Europe's April Emergencies: A Catalyst for Advanced Disaster Management	30/4/2025
TUC	Presentation at IEEE ICDE 2025	19/5/2025
	Web news: "Pioneering Data-Driven Solutions for Global Health Preparedness in the European Union"	22/5/2025
UPB	Presentation in an industrial conference "EU-Projekt CREXDATA: Erkenntnisse und Handlungsempfehlungen zum Einsatz KI-generierter Lageinformationen für die Lagebewertung und Maßnahmenplanung in Extremwetterlagen"	26/5/2025

	Web news: "CREXDATA and MePreCiSa Projects Join Forces in Urban Health and Big Data Integration"	29/5/2025
	Web news: "CREXDATA and FloodWaive Forge Alliance to Revolutionise Flood Management with AI Surrogate Models"	5/6/2025
UPB	Presentation at ESAF 2025	11/6/2025
NCSR	Presentation in a conference DEBS2025 "Run-Time Adaptation of Complex Event Forecasting"	11/6/2025
UA	Presentation in the 2025 Symposium on Maritime Informatics and Robotics (MARIS) "CORLEGS based Advanced Navigation System for Unmanned Surface Vessels"	26/6/2025
UA	Crexdata at Ro-Boat Race	27/6/2025
UPB	Presentation "Verification of workflows and processes to support early quality control" at CIRP ICME 2025 Ebel (not published by publisher)	16/7/2025
UPB	Presentation "Identifying future competence demands in production companies to inform strategic decision-making" at CIRP ICME 2025 Özcan (not published by publisher)	16/7/2025
UPB	Presentation "Test-oriented Resilient Requirements Engineering (ToRRE): Extending Model-based" at ICED 2025	11/8/2025
UPB	Presentation "Shifting boundaries from preparedness to response: Using" at Mensch und Computer	31/8/2025
TUC	Demo at VLDB2025 "NeuroFlinkCEP: Neurosymbolic Complex Event Recognition Optimized across IoT Platforms"	1/9/2025
UA	Workshop at DroneHorizon2025	4/9/2025
UPB	Presentation "Ganzheitliches Metadatenmodel für die Verifikation und Validierung in der Entwicklung komplexer technischer Systeme" at DfX Smyposium	11/9/2025
DCNA, DRZ	Workshop at Fachtagung Katastrophenforschung 2025	18/9/2025
UPB	Presentation at Presentation "Graphical AI workflow modelling: Identifying relevant competencies in AI-based automation of business processes" at IHSED 2025	22/9/2025
BSC	Poster presentation at 24th Annual International Conference on Systems biology	5/10/2025
UPB, DCNA	Web news: "CREXDATA Tests Emergency Response System in Final Austrian Trial"	8/10/2025
UA	Web news: Presentation at the Intelligent Transportation Systems Laboratory of the University of the Aegean in Syros	21/10/2025
UPB, FDDO, DRZ, TUC	Web news: Final trial in Dortmund	27/10/2025
DRZ	Moderation panel at SSRR2025	29/10/2025
Kpler	Presentation at ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems 2025	3/11/2025
UPB, FDDO, DRZ	A+A 2025 -- Weltleitmesse für sicheres und gesundes Arbeiten	4/11/2025
UPB	Presentation at "EU Science for Preparedness Conference"	4/11/2025
HYDS, BSC	Presentation at Smart City Expo Congress 2025	6/11/2025
UPB	Project booth at EBDVF 2025	11/11/2025
DRZ	EMERGENCY MANAGEMENT CLUSTER Workshop	21/11/2025
BSC	Presentation Digital Twin Models of the Human Respiratory System: A Multi-Scale Focus on the Lower Airways at Parallel CFD international conference 2025	24/11/2025
UPB	Project booth at Global Initiative on Resilience to Natural Hazards through AI Solutions	11/12/2025

6.2 Appendix 2 - CREXDATA Publications (M19-M36)

Table 12: Publications

Type of Publication	Title of Publication	Authors	Title of the journal /or equivalent	Publisher	Year
Conference proceedings/workshop	Complex Event Recognition with Symbolic Register Transducers	Elias Alevizos, Alexander Artikis, Georgios Paliouras	Proceedings of the VLDB Endowment	VLDB	2024
Article in journal	Probabilistic Discrete-Time Models for Spreading Processes in Complex Networks: A Review	Clara Granell, Sergio Gómez, Jesús Gómez-Gardeñes, Alex Arenas	Annalen der Physik, Volume 536 Issue 10	Wiley-VCH GmbH	2024
Article in journal	Case beyond historical severity: Winds, faults, outages, and costs for electric grid	Justinas Jasiūnas, Ilona Láng-Ritter, Tatu Heikkinen, Peter D. Lund	Applied Energy, Vol. 373	Elsevier Ltd.	2024
Conference proceedings/workshop	Techniques for interactive visual examination of autonomous vessel performance	Natalia Andrienko, Gennady Andrienko, Dimitris Zissis, Alexandros Troupiotis-Kapeliaris, and Giannis Spiliopoulos.	7th International Workshop on Big Data Visual Exploration and Analytics	BigVis 2024	2024
Conference proceedings/workshop	Extending the application of simulation from preparedness to response use cases in weather-induced emergencies	Jens Pottembaum, Marcel Ebel, Iris Gräßler	MCI-WS13: Workshop Mensch-Maschine-Interaktion in sicherheitskritischen Systemen	Association for Computing Machinery	2024
Conference proceedings/workshop	Quality Key Figures for Developing Future Scenarios	Iris Gräßler, Deniz Ozcan	Human Systems Engineering and Design: Future Trends and Applications (IHSED 2024)	AHFE	2024
Conference proceedings	Anwendungspotenziale von Künstlicher Intelligenz im Model-Based Systems Engineering für automatisierte Systeme	Iris Graessler, Deniz Oezcan	Automation 2024 AI beats Automation?	VDI Wissensforum	2024
Article in journal	Collection: The Aegean Ro-Boat Race 2023	Alexandros Troupiotis-Kapeliaris;	IEEE Data Descriptions (Volume: 1)	IEEE	2024

		Nikolaos Sapountzis; Giannis Spiliopoulos; Thomas Kogias; Piyabhum Chaysri; Bernardo AntÓnio Correia Gabriel			
Conference proceedings/workshop	Creating Synthetic Datasets for Deep Learning used in Machine Vision	Iris Gräßler, Michael Hieb	17th CIRP Conference on Intelligent Computation in Manufacturing Engineering (CIRP ICME 2023), Ischia (Gulf of Naples), Italy	Elsevier BV	2024
Article in journal	Rebound in epidemic control: how misaligned vaccination timing amplifies infection peaks	Piergiorgio Castioni, Sergio Gómez, Clara Granell, and Alex Arenas	npj Complexity 1, Article number 20	Nature	2024
Conference proceedings/workshop	Model-based planning of test cases and test scenarios to support engineering of Cyber-Physical Systems	Iris Graessler; Marcel Ebel; Jens Pottebaum	IEEE International Symposium on Systems Engineering (ISSE)	IEEE	2024
Article in journal	Impact of wind speed and soil frost on electricity distribution system reliability	Juha Haakana, Otto Räisänen, Markku Karhunen, Ilona Lang-Ritter, Jukka Lassila	Heliyon, Volume 10, Issue 24 e40846, December 30, 2024	Elsevier Ltd.	2024
Article in journal	RATS: A resource allocator for optimizing the execution of tumor simulations over HPC infrastructures	Errikos Streviniotis, Nikos Giatrakos, Yannis Kotidis, Thaleia Ntiniakou, Miguel Ponce de Leon	Information Systems	Elsevier Ltd.	2025
Conference proceedings/workshop	Communication-Efficient Distributed Deep Learning via Federated Dynamic Averaging	Michail Theologitis, Georgios Frangias, Georgios Anestis, Vasilis Samoladas, Antonios Deligiannakis	Proceedings of the 28th International Conference on Extending Database Technology (EDBT)	EDBT	2025
Conference proceedings/workshop	Generating Activity Definitions with Large Language Models	Andreas Kouvaras, Periklis Mantenoglou, Alexander Artikis	Proceedings of the 28th International Conference	EDBT	2025

			on Extending Database Technology (EDBT)		
Conference proceedings/workshop	Towards Run-Time Adaptation of Complex Event Forecasting	Manolis Pitsikalis, Elias Alevizos, Nikos Giatrakos and Alexander Artikis	7th International Workshop on Big Mobility Data Analytics (BMDA) co-located with the EDBT/ICDT	EDBT/ICDT	2025
Conference proceedings/workshop	Transforming Maritime Safety: Data-driven Applications for the Real-Time Detection and Mitigation of Maritime Incidents	Georgios Grigoropoulos, Alexandros Troupiotis-Kapeliaris, Ilias Chamatidis, Evangelia Filippou, Konstantina Bereta	Proceedings of the 28th International Conference on Extending Database Technology (EDBT)	OpenProceedings	2025
Conference proceedings/workshop	Temporal Specification Optimisation for the Event Calculus	Periklis Mantenoglou, Alexander Artikis	Proceedings of the AAAI Conference on Artificial Intelligence	Association for the Advancement of Artificial Intelligence	2025
Article in journal	Classifying extratropical cyclones and their impact on Finland's electricity grid: insights from 92 damaging windstorms	Ilona Láng-Ritter, Terhi Kristiina Laurila, Antti Mäkelä, Hilppa Gregow, and Victoria Anne Sinclair	Natural Hazards and Earth Systems Sciences	Copernicus Publications on behalf of the European Geosciences Union	2025
Conference proceedings/workshop	DAG*: A Novel A*-alike Algorithm for Optimal Workflow Execution across IoT Platforms	Errikos Streviniotis, Dimitrios Banelas, Nikos Giatrakos, Antonios Deligiannakis	41st International Conference on Data Engineering (ICDE)	IEEE	2025
Conference proceedings/workshop	EU-Projekt CREXDATA: Erkenntnisse und Handlungsempfehlungen zum Einsatz KI-generierter Lageinformationen für die Lagebewertung und Maßnahmenplanung in Extremwetterlagen	Jens Pottebaum, Iris Gräßler, Marcel Ebel, Deniz Özcan, Niklas Döhner, Sylvia Pratzler-Wanczura, Enes Derin, Oliver Krüger, Ivana Kruijff-Korbayova, Merlin Stampa	Tagungsband der 71. Jahresfachtagung der Vereinigung zur Förderung des Deutschen Brandschutzes (vfdb) e.V. 2025, 81-94.	VFDB	2025
Conference proceedings/workshop	Run-Time Adaptation of Complex Event Forecasting	Manolis Pitsikalis, Elias Alevizos, Nikos Giatrakos,	DEBS '25: Proceedings of the 19th	ACM	2025

		and Alexander Artikis	ACM International Conference on Distributed and Event-based Systems		
Thesis/dissertation	Windstorm impacts on the electrical grid : Meteorological and non-meteorological drivers	Ilona Láng-Ritter	Dissertationes Universitatis Helsingiensis ; 222/2025	University of Helsinki	2025
Article in journal	Assessing the impact of interregional mobility on COVID19 spread in Spain using transfer entropy	Miguel Ponce de León, Camila Pontes, Alfonso Valencia, Alex Arenas	Scientic Reports	Nature	2025
Conference proceedings	Method for systematic creation of test scenarios for early customer involvement	Iris Graessler, Marcel Ebel	CIRP Design	Elsevier	2025
Conference proceedings	Verification of workflows and processes to support early quality control	Iris Graessler, Marcel Ebel	Conference on Intelligent Computation in Manufacturing Engineering (CIRP ICME)	Elsevier	2025
Conference proceedings	Identifying future competence demands in production companies to inform strategic decision-making	Iris Graessler, Deniz Oezcan	Conference on Intelligent Computation in Manufacturing Engineering (CIRP ICME)	Elsevier	2025
Conference proceedings	Test-oriented Resilient Requirements Engineering (ToRRE): Extending Model-based	Iris Graessler, Marcel Ebel	International Conference on Engineering Design (ICED)	Cambridge University Press	2025
Conference proceedings	Shifting boundaries from preparedness to response: Using simulation of rescue robots in weather-induced emergencies	Iris Graessler, Niklas Doehner, Marcel Ebel, Jens Pottebaum	Mensch und Computer 2025 (MuC)	Association for Computing Machinery	2025
Conference proceedings	Ganzheitliches Metadatenmodel für die Verifikation und Validierung in der Entwicklung komplexer technischer Systeme	Iris Graessler, Marcel Ebel	Design for X Symposium		2025
Conference proceedings Conference proceedings	Graphical AI workflow modelling: Identifying relevant competencies	Iris Graessler, Deniz Oezcan	Human Systems Engineering and Design:	AHFE	2025

	in AI-based automation of business processes		Future Trends and Applications (IHSED 2025)		
Article in journal	Evaluating Instruction-Tuned Large Language Models for Automatic Annotation of Multilingual Climate Disaster-Related Social Media Messages	Jonathan Ayebakuro Orama, Marc Juvillà Garcia, Maite Melero	Frontiers in Artificial Intelligence and Applications	IOS Press	2025
Conference proceedings/workshop	Dynamic Weather-Resilient Vessel Routing using Big AIS Data	Alexandros Troupiotis-Kapeliaris, Georgios Grigoropoulos, Marios Vodas, Konstantina Bereta	SIGSPATIAL 2025	ACM	2025
Article in journal	SaaMS: The Synopses-as-a-MicroService Paradigm for Scalable Adaptive Streaming Analytics across the Cloud to Edge Continuum	Georgios Panagiotis Kalfakis, Nikos Giatrakos	Information Systems	Elsevier Ltd.	2025
Conference proceedings/workshop	NeuroFlinkCEP: Neurosymbolic Complex Event Recognition Optimized across IoT Platforms	Ourania Ntouni, Dimitrios Banelas, Nikos Giatrakos	51st International Conference on Very Large Data Bases (VLDB)	VLDB Endowment	2025
Conference proceedings/workshop	CORLEGS based Advanced Navigation System for Unmanned Surface Vessels	Elias Xidias; Dimitris Zissis; Giannis Spiliotopoulos	2025 Symposium on Maritime Informatics and Robotics (MARIS)	IEEE	2025
Article in journal	Network-driven vaccination strategies for preventing rebound dynamics in metapopulation epidemic control	Piergiorgio Castioni, Alex Arenas	Phys. Rev. E	American Physical Society	2025
Article in journal	The spread of the Delta variant in Catalonia during summer 2021: Modelling and interpretation	Benjamin Steinegger, Giulio Burgio, Piergiorgio Castioni, Clara Granell, Alex Arenas	Journal Of Infection And Public Health	Elsevier	2025

6.3 Appendix 3 – Exploitation Plan of each Partner

6.3.1 Barcelona Supercomputing Center (BSC)

Table 13: Exploitation plan of BSC

Scientific research infrastructure									
Partner Name:	Barcelona Supercomputing Center (BSC)								
Project Role:	research and development partner								
Target groups	Scientific community, Public institutions								
Notes	-								
Key Exploitable Results									
ID	**Name of the Key Exploitable Result**	**Other involved partners**	**If yes, who?**	**Joint ownership**	**If yes, who ?**	**Standalone Result**	**Integrated in Crexdata System**	**Intellectual Property Strategy**	**Type of Result (Algorithm/ Model/ Method/ Process/ Software/ Knowledge)**
BSC – 1	Relevance prediction model	No	X	No	X	Yes	X	Open Source	Model: X
BSC – 2	User friendly simulator	No							
BSC – 3	Question answering tool	Yes	NCSR	No	X	Yes	X	Open Source	Software: X
BSC – 4	EpiSim.jl – High-performance epidemic simulator for metapopulation models		No	No		Yes	Yes	Open-source (AGPL-3.0 license)	Software

	No								
BSC – 5	episim-emews – HPC workflow for epidemic model calibration and uncertainty quantification No		No	No		Yes	Yes	Open-source (AGPL-3.0 license)	Software
BSC – 6	episim-rl – Reinforcement learning workflow for adaptive epidemic intervention design Yes	NCSR	No	No		Yes	Yes	Open-source (AGPL-3.0 license)	Software
BSC – 7	Multiscale Lung Infection Digital Twin Model	No	–	No	–	No	Yes	Foreground research model developed within CREXDATA; reuse under open research and collaboration agreements	Model / Method
BSC – 8	HPC Workflow for Multiscale Infection Simulation Execution	No	–	No		Yes	Yes	Reusable workflow patterns and scripts developed as	Process / Software / Method

								CREXDATA foreground	
BSC – 9	RapidMiner Workflow for Multiscale Infection Analysis	Yes	Rapid Miner	No	–	Yes	Yes	Workflow configurations and analytical pipelines developed as CREXDATA foreground	Method / Software

Table 14: Exploitation plan of BSC

Scientific research infrastructure								
Partner Name:	Barcelona Supercomputing Center (BSC)							
Project Role:	research and development partner							
Target groups	Scientific community, Public institutions							
Notes	-							
Key Exploitable Results								
ID	**Exploitation Plan**	**Potential customers**	**Benefit to customers**	**Consultancy service/ Academic exploitation/ Commercial exploitation**	**Estimated maintenance cost**	**Estimated yearly selling price**	**Target group**	**Competitive advantage of the solution**
BSC – 1	The results are for publication in academic journals. As a research institute, we publish	Civil Protection Agencies, First	Enriched Incident Information, Low-latency	N/A	N/A (Open Source)	N/A (Open Source)	Emergency IT Managers, Incident Commanders	State-of-the-art research incorporated in a

	open-access scientific articles. The models utilize openly accessible tools. Also, the results are intended as a part of the CREXDATA and ARGOS platforms, to be used by rescue departments in decision making and action planning in extreme weather conditions. Plans for further application are not yet developed, as the methods are still in progress.	Responders, Meteorological Institutes, Research Institutes, Disaster Relief NGOs	Information Filtering	Article Publications, Open Source Data and Model Publication N/A (Open Source)			, Public Safety CTOs	commercial platform (Altair AI studio)
BSC – 2	Exploitation as part of a service and usage in the own institution.							
BSC – 3	The results are planned for publication in academic journals. As a research institute, we publish open-access scientific articles. The tool utilizes openly accessible models and code. Also, the results are intended as a part of the CREXDATA and ARGOS platforms, to be used by rescue departments in decision	Civil Protection Agencies, First Responders, Meteorological Institutes, Research Institutes, Disaster Relief NGOs	Improved Information Extraction, Enriched Incident Information / Reports	N/A Article Publications N/A (Open Source)	N/A (Open Source)	N/A (Open Source)	Emergency IT Managers, Incident Commanders, Public Safety CTOs	State-of-the-art research incorporated in a commercial platform (Altair AI studio)

	making and action planning in extreme weather conditions. Plans for further application are not yet developed, as the methods are still in progress							
BSC – 4	Research exploitation and integration into future EU and national projects; use as a reference simulator for epidemic scenario analysis and benchmarking	Research institutions, universities, public health agencies, policy advisory bodies	Enables reproducible, scalable epidemic simulations integrating mobility, demography, and interventions	Academic exploitation and consultancy	Low–medium (developer time for updates, bug fixes, documentation)	Not applicable (open-source)	Epidemiological modelers, data scientists, public health researchers	HPC-ready, modular Julia implementation; realistic metapopulation modeling with mobility and age structure
BSC – 5	Use in research projects and pilot studies for model calibration, uncertainty analysis, and scenario exploration	Research centers, HPC facilities, epidemiological modeling groups	Reduces computational cost of calibration; supports uncertainty-aware forecasting	Academic exploitation and consultancy	Medium (workflow updates, HPC compatibility, documentation)	Not applicable (open-source)	Computational epidemiologists, HPC users, model developers	Tight integration of HPC, ML-based exploration, and visual analytics
BSC – 6	Research exploitation in adaptive policy design, scenario stress-testing, and methodological studies	Research institutes, public health agencies, policy modeling groups	Enables automated discovery of adaptive intervention strategies	Academic exploitation and consultancy	Medium	Not applicable (open-source)	AI researchers, epidemiological modelers, decision-support developers	Runtime adaptation of interventions using RL tightly coupled with simulation

			under uncertainty					
BSC-7	Reuse in research projects on respiratory infections; demonstration for biomedical modelling and decision-support research; basis for future extensions	Research institutes; academic groups; public research hospitals	Ability to simulate and analyse infection dynamics at cellular and tissue scale under different intervention hypotheses	Academic exploitation; consultancy	NONE	N/A	Computational biologists; systems medicine researchers	Integrated multiscale representation of lung infection mechanisms not available in single-scale models
BSC-8	Reuse for executing and updating multiscale biomedical simulations; adaptation to other mechanistic disease models	Research infrastructures; modelling consortia; EU projects	Scalable, reproducible execution of complex multiscale simulations without modifying simulator source code	Academic exploitation; consultancy	NONE	N/A	HPC users; computational modelling teams	Simulator-agnostic execution workflow applicable beyond a single disease model
BSC-9	Reuse as an accessible analysis and evaluation layer for multiscale simulation outputs; demonstration to non-technical users	Research institutes; technology providers; applied research teams	Lower barrier to explore, compare, and evaluate simulation results without direct HPC interaction	Academic exploitation; consultancy	NONE	N/A	Non-technical analysts; decision-support researchers	Low-code analytical access to complex multiscale simulation outputs

Table 15: Exploitation plan of BSC

Scientific research infrastructure							
Partner Name:	Barcelona Supercomputing Center (BSC)						
Project Role:	research and development partner						
Target groups	Scientific community, Public institutions						
Notes	-						
Key Exploitable Results							
ID	**Technology Readiness Level (1-9)**	**Gaps until market readiness**	**Resources & budget requirements**	**Technical Risks & barriers**	**Code/ Solution commented?**	**Storage location of all data of the solution**	**Contact person**
BSC – 1	TRL 5 - TRL 6	Robust and scalable model deployment for real-time predictions, Paid access to social media data streams for real-time predictions, Testing and live demos	Budget for real-time stream of social media data, and model deployments	Social media media API access, Changes to social media usage guidelines, Privacy concerns	Yes	Zenodo / Huggingface	Jonathan Orama
BSC – 2	TRL 5 - TRL 6	Robust and scalable model deployment for real-time predictions, Paid access to social media data streams for real-time predictions, Testing and live demos	Budget for real-time stream of social media data, and model deployments	Social media media API access, Changes to social media usage guidelines, Privacy concerns	Yes	CREXDATA Repository	Georgios Katsimpras

BSC – 3	TRL 5 - TRL 6	Robust and scalable model deployment for real-time predictions, Paid access to social media data streams for real-time predictions, Testing and live demos	Budget for real-time stream of social media data, and model deployments	Social media media API access, Changes to social media usage guidelines, Privacy concerns	Yes	CREXDATA Repository	Georgios Katsimpras
BSC – 4	3	User-friendly interface, automated deployment, operational validation	Developer effort for usability, documentation, and validation studies	Data availability, calibration complexity, non-technical user adoption	Yes	CREXDATA Repositor / Zenodo	miguel.ponce@bsc.es
BSC – 5	2–3	Simplified configuration, GUI, automated deployment	Development for usability, training material, user support	HPC dependency, learning curve for non-experts	Yes	CREXDATA Repositor / Zenodo	miguel.ponce@bsc.es
BSC – 6	2	Robust policy validation, interpretability tools, regulatory trust	AI development, explainability, usability enhancements	Policy acceptance, reward design sensitivity, computational cost	Yes	CREXDATA Repositor / Zenodo	miguel.ponce@bsc.es
BSC-7	5	Clinical validation; usability improvements; regulatory alignment	HPC resources; modelling expertise; continued software support	Model calibration complexity; dependency on biological assumptions	Yes	BSC HPC infrastructure	Thalia Diniaco (BSC)

BSC-8	5	Improved documentation; user-friendly configuration interfaces	Minimal software maintenance	Dependency on HPC environment and scheduling systems	Yes	BSC HPC infrastructure	Thalia Diniaco (BSC)
BSC-9	5	Generalisation to additional use cases; user training material	Minor workflow maintenance and support	Dependence on external workflow platform	Yes	Crexdata repository	Thalia Diniaco (BSC)

6.3.2 Consiglio Nazionale delle Ricerche (CNR)

Table 16: Exploitation plan of CNR

Scientific research infrastructure									
Partner Name:	Consiglio Nazionale delle Ricerche (CNR)								
Project Role:	research and development partner								
Target groups	Public institutions, Private individualsstart-up, Scientific community,								
Notes	-								
Key Exploitable Results									
ID	**Name of the Key Exploitable Result**	**Other involved partners**	**If yes, who?**	**Joint ownership**	**If yes, who?**	**Standalone Result**	**Integrated in Crexdata System**	**Intellectual Property Strategy**	**Type of Result (Algorithm/ Model/ Method/ Process/ Software/ Knowledge)**
CNR – 1	Research products	Integration with WP 3	RM	No		Can be a standalone library; it is integrated within a set of CREXDATA RM operators	X	Open Source in full with implementation guide	Algorithm: X, Method: X, Software: X
CNR – 2	Explanation methods for ML models to be deployed in time – sensitive scenarios	No		No				Open Source in full with implementation guide	Algorithm: X, Process: X
CNR – 3	Pilot demonstrators	Collab with WP2		Yes	WP2	Integrated within CREXDATA operators	X	Open source. To be published	Algorithm: Software: X
CNR – 4	Models involving human expertise	Yes	FR			Extension of LORE algorithm	Yes, as part of the operator LORE	Open Source. Open access publication	Knowledge: X, Algorithm: X Software: X, Process: X

Table 17: Exploitation plan of CNR

Scientific research infrastructure								
Partner Name:	Consiglio Nazionale delle Ricerche (CNR)							
Project Role:	research and development partner							
Target groups	Public institutions, Private individualsstart-up, Scientific community,							
Notes	-							
Key Exploitable Results								
ID	Exploitation Plan	Potential customers	Benefit to customers	Consultancy service/ Academic exploitation/ Commercial exploitation	Estimated maintenance cost	Estimated yearly selling price	Target group	Competitive advantage of the solution
CNR – 1	An internal process is in place for exploiting research results, including institutional use and publication in specialized journals. Plans for further exploitation are not yet developed, as the methods are still under progress. We are working on creating general solutions that can be applied across various domains. The specific characteristics of each case should be carefully evaluated to ensure suitability and effectiveness.	Actors adopting AI-based classifiers to obtain a set of explanation based on rules	Making accessible the internal logic of a black box Possibility to make interpretable decision suggestions	It can be used as an open source library (already available on public repository in python) Academic papers and research have been produced	Currently maintained as open source repository. Possibility to expand the software as a scientific/academic asset in future projects	N/A	Private and Public Industry or academis	Possibility of using rule based explanations for multiple types of data (so far tabular data and images)

	The library was made extensible. Demonstrator of new plugins and generators							
CNR – 2	An internal process is in place for exploiting research results, including institutional use and publication in specialized journals. Plans for further exploitation are not yet developed, as the methods are still under progress. We are working on creating general solutions that can be applied across various domains. The specific characteristics of each case should be carefully evaluated to ensure suitability and effectiveness. The library was made extensible. Demonstrator of new plugins and generators	Actors adopting AI-based classifiers to obtain a set of explanation based on rules	Making accessible the internal logic of a black box Possibility to make interpretable decision suggestions	It can be used as an open source library (already available on public repository in python) Academic papers and research have been produced	Currently maintained as open source repository. Possibility to expand the software as a scientific/academic asset in future projects	N/A	Private and Public Industry or academis	Possibility of using rule based explanations for multiple types of data (so far tabular data and images)
CNR – 3	An internal process is in place for exploiting research results, including institutional use and	Actors adopting AI-based classifiers	Making accessible the internal logic of a	It can be used as an open source library (already available on public repository in python)	Currently maintained as open source repository.	N/A	Private and Public	Possibility of using rule based explanations

	publication in specialized journals. Plans for further exploitation are not yet developed, as the methods are still under progress. We are working on creating general solutions that can be applied across various domains. The specific characteristics of each case should be carefully evaluated to ensure suitability and effectiveness. The library was made extensible. Demonstrator of new plugins and generators	to obtain a set of explanation based on rules	black box Possibility to make interpretable decision suggestions	Academic papers and research have been produced	Possibility to expand the software as a scientific/academic asset in future projects		Industry or academis	for multiple types of data (so far tabular data and images)
CNR – 4	An internal process is in place for exploiting research results, including institutional use and publication in specialized journals. Plans for further exploitation are not yet developed, as the methods are still under progress.	Actors adopting AI-based classifiers to obtain a set of explanation based on rules	Making accessible the internal logic of a black box Possibility to make interpretable decision suggestions	It can be used as an open source library (already available on public repository in python) Academic papers and research have been produced	Currently maintained as open source repository. Possibility to expand the software as a scientific/academic asset in future projects	N/A	Private and Public Industry or academis	Possibility of using rule based explanations for multiple types of data (so far tabular data and images)

	We are working on creating general solutions that can be applied across various domains. The specific characteristics of each case should be carefully evaluated to ensure suitability and effectiveness. The library was made extensible. Demonstrator of new plugins and generators							

Table 18: Exploitation plan of CNR

Scientific research infrastructure							
Partner Name:	Consiglio Nazionale delle Ricerche (CNR)						
Project Role:	research and development partner						
Target groups	Public institutions, Private individualsstart-up, Scientific community,						
Notes	-						
Key Exploitable Results							
ID	Technology Readiness Level (1-9)	Gaps until market readiness	Resources & budget requirements	Technical Risks & barriers	Code/ Solution commented?	Storage location of all data of the solution	Contact person
CNR – 1	7	Fully working library. No market target for the moment	Based on Open source approach to develop the software. Possibility of using master theses and PhD theses for further improvements		Full documentation of LORE library Active repository on GitHub Set of didactic material used in academic master courses	Data agnostic approach	Salvo Rinzivillo
CNR – 2	7	Fully working library. No market target for the moment	Based on Open source approach to develop the software. Possibility of using master		Full documentation of LORE library Active repository on GitHub Set of didactic material used in academic master courses	Data agnostic approach	Salvo Rinzivillo

			theses and PhD theses for further improvements				
CNR – 3	7	Fully working library. No market target for the moment	Based on Open source approach to develop the software. Possibility of using master theses and PhD theses for further improvements		Full documentation of LORE library Active repository on GitHub Set of didactic material used in academic master courses	Data agnostic approach	Salvo Rinzivillo
CNR – 4	7	Fully working library. No market target for the moment	Based on Open source approach to develop the software. Possibility of using master theses and PhD theses for further improvements		Full documentation of LORE library Active repository on GitHub Set of didactic material used in academic master courses	Data agnostic approach	Salvo Rinzivillo

6.3.3 Desaster Competence Network Austria (DCNA)

Table 19: Exploitation plan of DCNA

Scientific research infrastructure									
Partner Name:	Disaster Competence Network Austria (DCNA)								
Project Role:	User								
Target groups	DCNA network: Organisations and Companies in the field of public safety, Public institutions, Scientific community								
Notes	-								
Key Exploitable Results									
ID	Name of the Key Exploitable Result	Other involved partners	If yes, who?	Joint ownership	If yes, who?	Standalone Result	Integrated in Crexdata System	Intellectual Property Strategy	Type of Result (Algorithm/ Model/ Method/ Process/ Software/ Knowledge)
DCNA – 1	Report or summary of evaluations and tests; Guideline for use of technology	No	X	X	X	X	No	X	Knowledge: X
DCNA – 2	Network (connections)	No	X	X	X	X	No	X	Knowledge: X
DCNA – 3	Evaluation results / experience	No	X	X	X	X	indirectly (feedback from stakeholders)	X	Knowledge: X
DCNA – 4	Evaluation methodologies	No	X	X	X	X	No	X	Method: X
DCNA – 5	Best-Practice Catalogue “Use Cases & KPIs”	No	X	X	X	X	No	X	Knowledge: X
DCNA – 6	Stakeholder Onboarding & Governance Playbook	DCNA will use the script/playbook as a foundation for workshops and advisory	X	X	X	X	No	X	Knowledge: X

		sessions supporting authorities and operators in safely implementing CREXDATA solutions.							

Table 20: Exploitation plan of DCNA

Scientific research infrastructure								
Partner Name:	Disaster Competence Network Austria (DCNA)							
Project Role:	User							
Target groups	DCNA network: Organisations and Companies in the field of public safety, Public institutions, Scientific community							
Notes	-							
Key Exploitable Results								
ID	Exploitation Plan	Potential customers	Benefit to customers	Consultancy service/ Academic exploitation/ Commercial exploitation	Estimated maintenance cost	Estimated yearly selling price	Target group	Competitive advantage of the solution
DCNA – 1	Showcase the findings from evaluations and tests, accompanied by a recommendation for the technology's usage.	Civil protection authorities, emergency service organizations	Provides evidence-based recommendations derived from real operational data and multi-agency feedback.	-	-	-	see potential customers	-
DCNA – 2	Utilize the existing network to serve as a point of contact	Civil protection authorities, emergency	Access to CREXDATA technology and	-	-	-	see potential customers	-

	in case there is interest in the system.	service organizations	knowledge created in the project					
DCNA – 3	Provide insights based on the evaluation outcomes, including expert experiences, performance metrics, and efficiency gains. Give feedback from evaluation results to partners	Civil protection authorities, emergency service organizations	their needs and requirements included in CREXDATA system	-	-	-	see potential customers	-
DCNA – 4	Detail the methodologies used in evaluations, including experimental setups, protocols, and testing criteria. Use methodologies to enhance the internal knowledge base, guiding best practices for future projects.	Civil protection authorities, emergency service organizations	Ensures a consistent, transparent approach to assessing disaster resilience activities, allowing authorities to compare results across different projects	-	-	-	see potential costumers, other disaster manageme nt projects	-

DCNA – 5	The catalogue will be used as an open reference to support evaluation and learning across exercises and training. DCNA will apply it in benchmarking and after-action reviews, providing tailored analytical reports and guidance to interested authorities.	Civil protection authorities, emergency service organizations	Provides ready-to-use operational examples and measurable indicators, supporting training, preparedness planning, and continuous improvement within emergency services	-	-	-	see potential costumers, other disaster management projects	-
DCNA – 6	DCNA will use the script/playbook as a foundation for workshops and advisory sessions supporting authorities and operators in safely implementing CREXDATA solutions.	Civil protection authorities, emergency service organizations	implifies integration and use of CREXDATA system for authorities and other organizations	-	-	-	see potential costumers	-

Table 21: Exploitation plan of DCNA

Scientific research infrastructure							
Partner Name:	Disaster Competence Network Austria (DCNA)						
Project Role:	User						
Target groups	DCNA network: Organisations and Companies in the field of public safety, Public institutions, Scientific community						
Notes	-						
Key Exploitable Results							
ID	Technology Readiness Level (1-9)	Gaps until market readiness	Resources & budget requirements	Technical Risks & barriers	Code/ Solution commented?	Storage location of all data of the solution	Contact person
DCNA – 1	7	ready	-	-	-	-	Jasmina Schmidt
DCNA – 2	7	ready	-	-	-	-	Jasmina Schmidt
DCNA – 3	7	ready	-	-	-	-	Jasmina Schmidt
DCNA – 4	7	ready	-	-	-	-	Jasmina Schmidt
DCNA – 5	7	ready	-	-	-	-	Jasmina Schmidt
DCNA – 6	7	ready	-	-	-	-	Jasmina Schmidt

6.3.4 Deutsches Rettungsrobotik Zentrum (DRZ)

Table 22: Exploitation plan of DRZ

Scientific research infrastructure									
Partner Name:		Deutsches Rettungsrobotikzentrum (DRZ)							
Project Role:		User							
Target groups		DRZ Members and other organisations and Companies in the field of public safety, public institutions, scientific community							
Notes		-							
Key Exploitable Results									
ID	Name of the Key Exploitable Result	Other involved partners	If yes, who?	Joint ownership	If yes, who?	Standalone Result	Integrated in Crexdata System	Intellectual Property Strategy	Type of Result (Algorithm/ Model/ Method/ Process/ Software/ Knowledge)
DRZ – 1	Data inventory / overview	No	X	No	X	Yes	No	Open Source	Knowledge: X
DRZ – 2	Network (connections)	No	X	No	X	Yes	X	X	Knowledge: X
DRZ – 3	Evaluation results / experience	No	X	No	X	X	indirectly (feedback from stakeholders)	X	Knowledge: X
DRZ – 4	Evaluation methodologies	No	X	No	X	X	No	X	Method: X
DRZ – 5	Data	No	X	No	X	Yes	Yes	Open Source	Data: X
DRZ – 6	Methodology to create 3D-models	No	X	No	X	Yes	No	X	Knowledge: X
DRZ – 7	Training on 3D-model creation	No	X	No	X	Yes	No	X	Knowledge: X

Table 23: Exploitation plan of DRZ

Scientific research infrastructure								
Partner Name:	Deutsches Rettungsrobotikzentrum (DRZ)							
Project Role:	User							
Target groups	DRZ Members and other organisations and Companies in the field of public safety, public institutions, scientific community							
Notes	-							
Key Exploitable Results								
ID	Exploitation Plan	Potential customers	Benefit to customers	Consultancy service/ Academic exploitation/ Commercial exploitation	Estimated maintenance cost	Estimated yearly selling price	Target group	Competitive advantage of the solution
DRZ – 1	Organize and present an overview of the collected data to publish on AIonDemand and DRZ website. Use in subsequent activities, such as other projects as well as consulation for DRZ members and other partners/clients.	Developers	Data for testing	Consultancy service/ Academic exploitation	-	-	See potential customers	Relevance to practical application
DRZ – 2	Utilize the existing network to serve as a point of contact in case there is interest in the system. Use network for recruiting DRZ members.	Civil protection authorities, emergency service organizations	Access to CREXDATA technology and knowledge created in the project	Consultancy service/ Academic exploitation	-	-	See potential customers	-
DRZ – 3	Showcase the findings from evaluations and tests, accompanied by a recommendation for the technology's usage.	Civil protection authorities, emergency service	Provides evidence-based recommendations	Consultancy service/ Academic exploitation	-	-	See potential customers	-

	Provide insights based on the evaluation outcomes, including expert experiences, performance metrics, and efficiency gains. Pass on feedback from evaluation results to members and other partners as part of DRZ services.	organizations	derived from real operational data and multi-agency feedback.					
DRZ – 4	Detail the methodologies used in evaluations, including experimental setups, protocols, and testing criteria. Use methodologies to enhance the internal knowledge base and to guide best practices for future projects and contracts, as part of DRZ services.	Civil protection authorities, emergency service organizations, R&D actors	Ensures a consistent, transparent approach to assessing disaster resilience activities, allowing authorities to compare results across different projects	Consultancy service/ Academic exploitation	-	-	See potential customers	-
DRZ – 5	Make data and documentation available in an open source repository. Use collected data in subsequent activities, such as other projects, contracts and other DRZ services.	Civil protection authorities, emergency service organizations, R&D actors	Support by building on existing resources and experience	Consultancy service/ Academic exploitation	-	-	See potential customers	-

DRZ – 6	Detail the methodology for 3D modelling. Use it in subsequent activities, such as other projects, deployments of the Robotics Task Force and training.	Civil protection authorities, emergency service organizations	Use of advanced technologies to support emergency response	Consultancy service/ Academic exploitation	-	-	See potential customers	-
DRZ – 7	Further develop and incorporate the training material for use as part of training courses provided by DRZ as a service.	Civil protection authorities, emergency service organizations	Training with state of the art tools applied to relevant practical situations	Training service	2.000 Euro annually	Estimated annual service value 20.000 Euro	See potential customers	-

Table 24: Exploitation plan of DRZ

Scientific research infrastructure							
Partner Name:	Deutsches Rettungsrobotikzentrum (DRZ)						
Project Role:	User						
Target groups	DRZ Members and other organisations and Companies in the field of public safety, public institutions, scientific community						
Notes	-						
Key Exploitable Results							
ID	Technology Readiness Level (1-9)	Gaps until market readiness	Resources & budget requirements	Technical Risks & barriers	Code/ Solution commented?	Storage location of all data of the solution	Contact person
DRZ – 1	-	ready	-	-	-	-	Ivana Kruijff
DRZ – 2	-	ready	-	-	-	-	Ivana Kruijff
DRZ – 3	-	ready	-	-	-	-	Ivana Kruijff
DRZ – 4	-	ready	-	-	-	-	Ivana Kruijff
DRZ – 5	-	ready	-	-	-	-	Merlin Stampa
DRZ – 6	-	ready	-	-	-	-	Merlin Stampa
DRZ – 7	-	training the trainers	Trainers	-	-	-	Merlin Stampa

6.3.5 Feuerwehr Dortmund (FDDO)

Table 25: Exploitation plan of FDDO

Scientific research infrastructure									
Partner Name:	Fire Department of Dortmund, Stadt Dortmund (FDDO)								
Project Role:	User and public organisation								
Target groups	-								
Notes	-								
Key Exploitable Results									
ID	Name of the Key Exploitable Result	Other involved partners	If yes, who?	Joint ownership	If yes, who?	Standalone Result	Integrated in Crexdata System	Intellectual Property Strategy	Type of Result (Algorithm/ Model/ Method/ Process/ Software/ Knowledge)
FDDO – 1	Report or summary of evaluations and tests; Guideline for use of technology	No	X	No	X	X		X	
FDDO – 2	Data inventory / overview	No	X	No	X	X		Open source, as long as it is not critical data	
FDDO – 3	Network (connections)	No	X	No	X	X		X	
FDDO – 4	Evaluation results / experience	No	X	No	X	X		X	
FDDO – 5	Data	Yes	UPB DCNA DRZ CNR Institut der Feuerwehr NRW	Yes	UPB	X		Open source, as long as it is not critical data	

Table 26: Exploitation plan of FDDO

Scientific research infrastructure								
Partner Name:	Fire Department of Dortmund, Stadt Dortmund (FDDO)							
Project Role:	User and public organisation							
Target groups	-							
Notes	-							
Key Exploitable Results								
ID	Exploitation Plan	Potential customers	Benefit to customers	Consultancy service/ Academic exploitation/ Commercial exploitation	Estimated maintenance cost	Estimated yearly selling price	Target group	Competitive advantage of the solution
FDDO – 1	Showcase the findings from evaluations and tests, accompanied by a recommendation for the technology's usage.							
FDDO – 2	Organize and present an overview of the collected data, including sources, types, and relevance. Prepare detailed documentation that allows others to replicate or build upon our work, which increases adoption and collaboration							
FDDO – 3	Utilize the existing network to serve as a							

	point of contact in case there is interest in the system. BUT NO ACTIVE ADVERTISING							
FDDO – 4	Provide insights based on the evaluation outcomes, including expert experiences, performance metrics, and efficiency gains. Give feedback from evaluation results to partners							
FDDO – 5	Outline the processes, tools, and protocols used for data collection, ensuring the reliability, scalability, and ethical considerations of the data acquired. Create detailed documentation on the data collection protocols and processes, which can serve as a knowledge resource for internal teams or external partners.							

Table 27: Exploitation plan of FDDO

Scientific research infrastructure							
Partner Name:	Fire Department of Dortmund, Stadt Dortmund (FDDO)						
Project Role:	User and public organisation						
Target groups	-						
Notes	-						
Key Exploitable Results							
ID	Technology Readiness Level (1-9)	Gaps until market readiness	Resources & budget requirements	Technical Risks & barriers	Code/ Solution commented?	Storage location of all data of the solution	Contact person
FDDO – 1							Enes Derin
FDDO – 2							Enes Derin
FDDO – 3							Enes Derin
FDDO – 4							Enes Derin
FDDO – 5							Enes Derin

6.3.6 Finnish Meteorological Institute (FMI)

Table 28: Exploitation plan of FMI

Scientific research infrastructure									
Partner Name:	Finnish Meteorological Institute (FMI)								
Project Role:	-								
Target groups	Rescue and health sector as well in addition to scientic community								
Notes	-								
Key Exploitable Results									
ID	Name of the Key Exploitable Result	Other involved partners	If yes, who?	Joint ownership	If yes, who?	Standalone Result	Integrated in Crexdata System	Intellectual Property Strategy	Type of Result (Algorithm/ Model/ Method/ Process/ Software/ Knowledge)
FMI – 1	Development of FMI Gradient Boosting impact-based forecasts for rescue services in Finland.				No		X	Commercial code open source is not open source/scientific publication is open source	Algorithm: X, Model: X, Process: X, Method: X, Knowledge: X
FMI – 2	Scientific publications	No	Yes	MoIFI	No			Open Source	Method: X, Knowledge: X
FMI – 3	Utilize project technologies in Finland with stakeholders				No			Not open source available	Knowledge: X
FMI – 4	Meteorological datasets				No		X	Open Source/Access to not open source data	

Table 29: Exploitation plan of FMI

Scientific research infrastructure								
Partner Name:	Finnish Meteorological Institute (FMI)							
Project Role:	-							
Target groups	Rescue and health sector as well in addition to scientic community							
Notes	-							
Key Exploitable Results								
ID	Exploitation Plan	Potential customers	Benefit to customers	Consultancy service/ Academic exploitation/ Commercial exploitation	Estimated maintenance cost	Estimated yearly selling price	Target group	Competitive advantage of the solution
FMI – 1	Exploitation as part of services and usage internally at FMI operational weather service and externally especially in the rescue departments to plan their management. Deeper understanding of weather-related impacts were used to improve the quality of service and refine the resolution of the previous ML products from the county level to the municipality level. This KER helps the rescue department to plan their resource management in different extreme weather conditions or wildfires. We will also discuss the developments in Finland with other rescue partners in the projects and explore the possibility to model other European pilot sites (Dorthmund and Innsbruck) but also look for possibiliter for	Civil protection, First responders, meteorologists, municipalities and cities		Academix exploitation: papers on impact reseach				High level of the impact forecast quality and spatial

	other novelties such as to model wildfires spread.							
FMI – 2	As a research institute we publish scientific articles that are open source and the results are always communicated through the existing FMI communication channels. The study uses openly accessable statistical and machine learning modelling approaches. Furthermore, we'll participate meteorologicala and multidisiplinary scientific conferences to outreach scientific community.							
FMI – 3	Organize workshops to test and evaluate project technologies that are useful for the Finnish stakeholder (Helsinki Rescue Department)							
FMI – 4	Provide relevant meteorological data to project modelling	Various weather dependent sectors	Accurate weather information					

Table 30: Exploitation plan of FMI

Scientific research infrastructure							
Partner Name:	Finnish Meteorological Institute (FMI)						
Project Role:	-						
Target groups	Rescue and health sector as well in addition to scientic community						
Notes	-						
Key Exploitable Results							
ID	Technology Readiness Level (1-9)	Gaps until market readiness	Resources & budget requirements	Technical Risks & barriers	Code/ Solution commented?	Storage location of all data of the solution	Contact person
FMI – 1	Very far developed, final tuning for the specific customer needs still needed	Finding those customers, which have resources to buy the product		Development resources after project might be limited	Yes		Ilona Lang-Ritter, Lisa Haga, Matti Kämäräinen
FMI – 2							Ilona Lang-Ritter, Lisa Haga
FMI – 3							Ilona Lang-Ritter, Lisa Haga
FMI – 4							Ilona Lang-Ritter, Lisa Haga

6.3.7 Fraunhofer (FR)

Table 31: Exploitation plan of Frauenhofer

Scientific research infrastructure									
Partner Name:	Barcelona Supercomputing Center (BSC)								
Project Role:	research and development partner								
Target groups	Scientific community, Public institutions								
Notes	-								
Key Exploitable Results									
ID	Name of the Key Exploitable Result	Other involved partners	If yes, who?	Joint ownership	If yes, who?	Standalone Result	Integrated in Crexdata System	Intellectual Property Strategy	Type of Result (Algorithm/ Model/ Method/ Process/ Software/ Knowledge)
FR – 1	Research products								

Table 32: Exploitation plan of Frauenhofer

Scientific research infrastructure								
Partner Name:	Barcelona Supercomputing Center (BSC)							
Project Role:	research and development partner							
Target groups	Scientific community, Public institutions							
Notes	-							
Key Exploitable Results								
ID	Exploitation Plan	Potential customers	Benefit to customers	Consultancy service/ Academic exploitation/ Commercial exploitation	Estimated maintenance cost	Estimated yearly selling price	Target group	Competitive advantage of the solution
FR – 1	Currently, an internal process is started for defining exploitation plans for our research results, including institutional use,							

	publication in scientific literature and presentations on relevant conferences. Plans for further exploitation are not yet finally defined, as the methods are still under developemnt. We are working on generalizing our approaches to enable their application in different problem settings and application domains.							

Table 33: Exploitation plan of Frauenhofer

Scientific research infrastructure							
Partner Name:	Barcelona Supercomputing Center (BSC)						
Project Role:	research and development partner						
Target groups	Scientific community, Public institutions						
Notes	-						
Key Exploitable Results							
ID	Technology Readiness Level (1-9)	Gaps until market readiness	Resources & budget requirements	Technical Risks & barriers	Code/ Solution commented?	Storage location of all data of the solution	Contact person
FR – 1							Gennady Adrienko

6.3.8 Ministry of Interoiur (MoIFI)

Table 34: Exploitation plan of MoIFI

Scientific research infrastructure									
Partner Name:	Ministry of the Interior Finland (MoIFI)								
Project Role:	-								
Target groups	Public institutions, rescue services,								
Notes	-								
Key Exploitable Results									
ID	Name of the Key Exploitable Result	Other involved partners	If yes, who?	Joint ownership	If yes, who?	Standalone Result	Integrated in Crexdata System	Intellectual Property Strategy	Type of Result (Algorithm/ Model/ Method/ Process/ Software/ Knowledge)
MoIFI – 1	(Guidance on how to use products)								
MoIFI – 2	Open Source CREXDATA product								Method: X, Knowledge: X
MoIFI – 3	Utlilize project technologies in Finland with stakeholders	Yes	FMI					Not open source available	Knowledge: X

Table 35: Exploitation plan of MoIFI

Scientific research infrastructure								
Partner Name:	Ministry of the Interior Finland (MoIFI)							
Project Role:	-							
Target groups	Public institutions, rescue services,							
Notes	-							
Key Exploitable Results								
ID	Exploitation Plan	Potential customers	Benefit to customers	Consultancy service/ Academic exploitation/ Commercial exploitation	Estimated maintenance cost	Estimated yearly selling price	Target group	Competitive advantage of the solution

MoIFI – 1	(Yes, in full without implementation guide)							
MoIFI – 2	Use in your own institution							
MoIFI – 3	Organize workshops to test and evaluate project technologies that are useful for the Finnish stakeholder (Helsinki Rescue Department)							

Table 36: Exploitation plan of MoIFI

Scientific research infrastructure							
Partner Name:	Ministry of the Interior Finland (MoIFI)						
Project Role:	-						
Target groups	Public institutions, rescue services,						
Notes	-						
Key Exploitable Results							
ID	Technology Readiness Level (1-9)	Gaps until market readiness	Resources & budget requirements	Technical Risks & barriers	Code/ Solution commented?	Storage location of all data of the solution	Contact person
MoIFI – 1							Taina Hanhikoski
MoIFI – 2							Taina Hanhikoski
MoIFI – 3							Taina Hanhikoski

6.3.9 Maritime Traffic / kpler (MT)

Table 37: Exploitation plan of MT/ Kpler

Scientific research infrastructure									
Partner Name:	Kpler (MT/ Kpler)								
Project Role:	-								
Target groups	Maritime, Robotics / Drone Industry, Augmented and Virtual Reality								
Notes	-								
Key Exploitable Results									
ID	Name of the Key Exploitable Result	Other involved partners	If yes, who?	Joint ownership	If yes, who?	Standalone Result	Integrated in Crexdata System	Intellectual Property Strategy	Type of Result (Algorithm/ Model/ Method/ Process/ Software/ Knowledge)
Kpler – 1	Vessel Collision Detection and Avoidance	No	X	X	X	No		Not open source available / Sole Ownership (Proprietary)	Algorithm: X, Software: X
Kpler – 2	Hazardous Weather Routing	No	X	X	X	No		Not open source available / Sole Ownership (Proprietary)	Algorithm: X, Model: X, Software: X
Kpler – 3	Multi-object Data Fusion	No	X	X	X	No		Not open source available / Sole Ownership (Proprietary)	Method: X

Table 38: Exploitation plan of MT/ Kpler

Scientific research infrastructure								
Partner Name:	Kpler (MT/ Kpler)							
Project Role:	-							
Target groups	Maritime, Robotics / Drone Industry, Augmented and Virtual Reality							
Notes	-							
Key Exploitable Results								
ID	Exploitation Plan	Potential customers	Benefit to customers	Consultancy service/ Academic exploitation/ Commercial exploitation	Estimated maintenance cost	Estimated yearly selling price	Target group	Competitive advantage of the solution
Kpler – 1	The solution is transferable to VTMS systems for VTS operators to receive automatic suggestion from rerouting vessel on a collision course. Similarly this can be applied on the ECDIS systems onboard manned vessels. Currently, vessel collision forecasting focuses on the detection of the incident. The decision making regarding courses	Global shipping companies and fleet operators Port authorities and Vessel Traffic Management Systems (VTMS) Maritime insurers and classification societies Autonomous vessel technology developers	Significant reduction in collision risks and near-misses Improved compliance with COLREGs and regulatory requirements Enhanced operational safety and reduced insurance premiums Real-time decision support and optimized routing for manned and unmanned fleets	Consultancy service: X Commercial exploitation: X	200 k per year (cloud infrastructure, data ingestion, software updates)	50k–100k annual SaaS/API licensing		Real-time global AIS ingestion from 6,600+ receivers (>10^9 messages/day) Fully COLREGs-compliant avoidance trajectories generated dynamically Scalable architecture using actor-model processing (Apache Pekko)

	of action is left with the crew. The KER Vessel Collision Detection and Avoidance automatically generates a COLREG compliant route alternative to avoid the collision. Thus, crews are not required to plan the evasive action themselves under time pressure.							
Kpler – 2	The solution can be brought into production as a weather routing service for vessel voyage planning or it may be integrated with ECDIS systems onboard manned vessels. Additionally, it may be used for weather enabled vessel route forecasting and vessel route	Commercial shipping companies and charterers Energy and commodity traders Insurers and risk management services Maritime logistics platforms and fleet management software providers	Reduced weather-related delays and costly route deviations Improved ETA accuracy and supply chain reliability Fuel savings from optimized routing and avoidance of severe weather Enhanced decision-making with scenario planning tools	Consultancy service: X Commercial exploitation: X	120k–180k annually (ETL pipelines, data subscriptions, weather data integration)	20k per liecense yearly 100k per API integration with third-party platforms		Unique fusion of AIS data, historical mobility patterns, and NOAA/Copernicus forecasts Multi-criteria routing (weather-optimized, traffic-optimized, shortest path) Modular architecture with H3 grid and A* algorithm for scalable rerouting

	monitoring over large sea areas. The KER Hazardous Weather Routing automatically generates a route alternative to avoid hazardous weather conditions at sea based on the updated weather forecasts from the COPERNICUS and NOAA Services. Thus, crews or ship operators are not required to monitor weather forecasts and changing weather conditions along their vessel(s) routes and reroute the vessel away from hazardous weather sea areas.							Demonstrated scalability on >240 M AIS records and 8 M km² sea area
Kpler – 3	Transferable to the MarineTraffic AIS platform or any system fusing	Maritime technology vendors and OEMs	Unified view of vessel behaviour, weather, and risk in one system	Consultancy service: X Commercial exploitation: X	50 k annually (cloud orchestration, API hosting,	50 k–200 k depending on usage volume		Scalable data fusion and analytics from

	multiple data sources combining weather and AIS data to accurately estimate vessel positions and forecast events of interest in the maritime domain.	Fleet analytics and compliance solution providers Port authorities and infrastructure operators Coast guard, and environmental monitoring agencies	Improved coordination and predictive analytics for critical maritime events Faster response times through automated alerts and scenario simulation Easier integration with third-party systems via modular APIs		security compliance)			AIS, weather, and traffic datasets Strong foundation for future autonomous vessel support and advanced analytics

Table 39: Exploitation plan of MT/ Kpler

Scientific research infrastructure							
Partner Name:	Kpler (MT/ Kpler)						
Project Role:	-						
Target groups	Maritime, Robotics / Drone Industry, Augmented and Virtual Reality						
Notes	-						
Key Exploitable Results							
ID	Technology Readiness Level (1-9)	Gaps until market readiness	Resources & budget requirements	Technical Risks & barriers	Code/ Solution commented?	Storage location of all data of the solution	Contact person
Kpler – 1	6	Full-scale validation with multiple fleets in real operational environments UI/UX refinements and integration with existing VTMS platforms	5P for engineering and DevOps 500k total for deployment, certification, and go-to-market activities	Data latency or incomplete AIS coverage in remote areas Variability in COLREGs		AWS Kpler	Georgios Grigoropoulos

		Further testing on autonomous vessel interoperability		interpretation by regional authorities Integration complexity with legacy traffic systems			
Kpler – 2	6	Higher-resolution weather data fusion and near-real-time updates Operational testing across diverse sea routes and seasonal conditions User interface enhancement for decision-support workflows Optimizer integration for operational constraints	10P for data engineering, ETL, and forecasting integration 1M total for production deployment and partnership development	Forecast uncertainty and differences between models Computational demands for large-scale spatiotemporal routing Integration challenges with external voyage planning systems		AWS Kpler	Georgios Grigoropoulos
Kpler – 3	6	Advanced user interface for analytics dashboards Additional integrations with third-party data feeds and sensor networks Formal certification for mission-critical maritime operations	5P for backend engineering, DevOps, and partner integration 500k total for commercial rollout and certification processes	Data standardization and interoperability issues across multiple data sources Security and data privacy compliance (GDPR, IMO) Complexity of integrating predictive analytics into legacy systems		AWS Kpler	Georgios Grigoropoulos

6.3.10 National Centre For Scientific Research Demokritos (NCSR)

Table 40: Exploitation plan of NCSR

Scientific research infrastructure									
Partner Name:	Demokritos - national centre for scientific research (NCSR)								
Project Role:	research partner								
Target groups	-								
Notes	-								
Key Exploitable Results									
ID	Name of the Key Exploitable Result	Other involved partners	If yes, who?	Joint ownership	If yes, who?	Standalone Result	Integrated in Crexdata System	Intellectual Property Strategy	Type of Result (Algorithm/ Model/ Method/ Process/ Software/ Knowledge)
NCSR – 1	Research papers	No							Knowledge
NCSR – 2	Software prototypes for Complex Event Forecasting, Early Time-Series Classification and Optimization for Interactive Learning Workflows	No				Yes	Yes	Context- and usage-dependent. Free to use for research purposes. May require licensing fees for commercial purposes.	Software
NCSR – 3	Software prototypes for Early Time-Series Classification	No				Yes	Yes	Context- and usage-dependent. Free to use for research purposes. May require licensing fees for commercial purposes.	Software

NCSR – 4	Software prototypes for Optimization for Interactive Learning Workflows	No				Yes	Yes	Context- and usage-dependent. Free to use for research purposes. May require licensing fees for commercial purposes.	Software

Table 41: Exploitation plan of NCSR

Scientific research infrastructure								
Partner Name:	Demokritos - national centre for scientific research (NCSR)							
Project Role:	research partner							
Target groups	-							
Notes	-							
Key Exploitable Results								
ID	Exploitation Plan	Potential customers	Benefit to customers	Consultancy service/ Academic exploitation/ Commercial exploitation	Estimated maintenance cost	Estimated yearly selling price	Target group	Competitive advantage of the solution
NCSR – 1	Publish results in academic journals and scientific conferences. Continue research in future projects.							
NCSR – 2	Distribute codebase of software prototypes as open source projects. Continue development in future projects. Note that the forecasting engine has been developed (and							

	awarded a patent) in a previous project.							
NCSR – 3	Distribute codebase of software prototypes as open source projects. Continue development in future projects. Note that the forecasting engine has been developed (and awarded a patent) in a previous project.							
NCSR – 4	Distribute codebase of software prototypes as open source projects. Continue development in future projects. Note that the forecasting engine has been developed (and awarded a patent) in a previous project.							

Table 42: Exploitation plan of NCSR

Scientific research infrastructure							
Partner Name:	Demokritos - national centre for scientific research (NCSR)						
Project Role:	research partner						
Target groups	-						
Notes	-						
Key Exploitable Results							
ID	Technology Readiness Level (1-9)	Gaps until market readiness	Resources & budget requirements	Technical Risks & barriers	Code/ Solution commented?	Storage location of all data of the solution	Contact person
NCSR – 1							Elias Alevizos
NCSR – 2	4						Charilaos Akasiadis
NCSR – 3	4						
NCSR – 4	4						

6.3.11 Altair RapidMiner (RM)

Table 43: Exploitation plan of RM

Scientific Research Infrastructure									
Partner Name:	RapidMiner GmbH / Altair RapidMiner (RM)								
Project Role:	commercial development and integration								
Target Groups:	companies and organizations across all application domains and sectors								
Notes	The CREXDATA system uses the Alair RapidMiner platform for system integration, data handling, data analytics, machine learning (ML), and artificial intelligence (AI). Altair RapidMiner AI Studio (desktop software) is used for visual workflow design and Altair RapidMiner AI Hub (server) and Real-Time Scoring Agents (RTSA) (edge) are used for running workflows. Within the CREXDATA project, RM developed several extensions for the RapidMiner platform to integrate the other CREXDATA system components (data sources, simulators, optimizers, etc.) and to enable real-time data stream processing of Kafka-based data streams.								
Key Exploitable Results									
ID	Name of the Key Exploitable Result	Other involved partners	If yes, who?	Joint owner-ship	If yes, who?	Standalone Result	Integrated in CREXDATA System	Intellectual Property Strategy	Type of Result (Algorithm/ Model/ Method/ Process/ Software/ Knowledge)
RM – 1	RapidMiner Extension for Kafka Data Streaming Handling	No	-	No	RM	No (underlying Altair RapidMiner platform required)	Yes	Open Source / Sole Ownership (Proprietary)	Software
RM – 2	RapidMiner Extension for FMI Forecast Integration	Yes	FMI: data provi-der	No	RM	No (underlying Altair RapidMiner platform required)	Yes	Open Source / Sole Ownership (Proprietary)	Software
RM – 3	RapidMiner Extension for Drone Data Integration	Yes	DRZ: data provi-der, UPB: data	No	RM	No (underlying Altair RapidMiner platform required)	Yes	Open Source / Sole Ownership (Proprietary)	Software

			provi-der						
RM – 4	RapidMiner Extension for HYDS ARGOS Integration	Yes	HYDS: data provi-der, inter-face design	No	RM	No (underlying Altair RapidMiner platform and HYDS ARGOS required)	Yes	Open Source / Sole Ownership (Proprietary)	Software
RM – 5	RapidMiner Extension for BSC Health Emergency Simulator Integration	Yes	BSC: co-develo per	Yes	BSC, RM	No (underlying Altair RapidMiner platform and BSC simulator required)	Yes	Open Source / Sole Ownership (Proprietary)	Software
RM – 6	RapidMiner Extension for FloodWaive Simulator Integration	Yes	Flood-Waive: data provi-der, UPB: co-develo per	Yes	UPB, RM	No (underlying Altair RapidMiner platform and FloodWaive simulator required)	Yes	Open Source / Sole Ownership (Proprietary)	Software
RM – 7	RapidMiner Extension for Gazebo Simulator Integration	Yes	UPB: co-develo per	Yes	UPB, RM	No (underlying Altair RapidMiner platform and Gazebo simulator required)	Yes	Open Source / Sole Ownership (Proprietary)	Software
RM – 8	RapidMiner Extension for Kpler Maritime Simulator Integration	Yes	Kpler: data provi-der	No	RM	No (underlying Altair RapidMiner platform and Kpler	Yes	Open Source / Sole Ownership (Proprietary)	Software

						maritime simulator required)			
RM – 9	RapidMiner Extension for Simulation HyperSuite Integration	Yes	UPB: co-developer	Yes	UPB, RM	No (underlying Altair RapidMiner platform, FloodWaive simulator, and Gazebo simulator required)	Yes	Open Source / Sole Ownership (Proprietary)	Software
RM – 10	RapidMiner Extension for Complex Event Forecasting (CEF) Integration	Yes	NCSR: system component provi-der	No	RM	No (underlying Altair RapidMiner platform and CEF component required)	Yes	Open Source / Sole Ownership (Proprietary)	Software
RM – 11	RapidMiner Extension for BSC Social Media Text Analytics Integration	Yes	BSC: co-developer	Yes	BSC, RM	No (underlying Altair RapidMiner platform and BSC Social Media Text Analytics component required)	Yes	Open Source / Sole Ownership (Proprietary)	Software
RM – 12	RapidMiner Extension for Explainable AI (XAI) Integration (LORE)	Yes	CNR: co-developer	Yes	CNR, RM	No (underlying Altair RapidMiner platform and CNR LORE required)	Yes	Open Source / Sole Ownership (Proprietary)	Software
RM – 13	RapidMiner Extension for NCSR Optimizer Integration	Yes	NCSR: system component	No	RM	No (underlying Altair RapidMiner platform and NCSR Optimizer required)	Yes	Open Source / Sole Ownership (Proprietary)	Software

			provi-der						
RM – 14	RapidMiner Extension for Fraunhofer IAIS Visualization Integration	Yes	Fraunhofer IAIS: system component provider	No	RM	No (underlying Altair RapidMiner platform and Fraunhofer IAIS visualization component required)	Yes	Open Source / Sole Ownership (Proprietary)	Software
RM – 15	CREXDATA Platform	Yes	FMI, DRZ, HYDS, BSC, Flood-Waive, UPB, Kpler, NCSR, CNR, TUC, UoA, Fraun-hofer	Yes	FMI, DRZ, HYDS, BSC, Flood-Waive, UPB, Kpler, NCSR, CNR, TUC, UoA, Fraun-hofer	No (underlying Altair RapidMiner platform as well as partner systems required, i.e. FMI Forecasts, DRZ Drone Data, HYDS ARGOS, BSC Simulators, FloodWaive Simulator, Gazebo Simulator, Kpler Maritime Simulator, Simulation HyperSuite, Complex Event Forecasting (CEF) component, Multi-Modal Data Fusion Toolbox (UoA), Edge-to-Cloud Extension (TUC),	Yes	While the RapidMiner extensions newly developed for the CREXDATA platform will be made open source, the previously existing Altair RapidMiner platform is available in different versions, including an open source version and a more powerful enterprise version. The enterprise version is not open source. Altair is the sole owner of the Altair	Software

						Social Media Text Analytics Component (BSC), LORE XAI (CNR), Visualization Component (Fraunhofer), Augmented Reality (AR) Component)		RapidMiner platform.	

Table 44: Exploitation plan of RM

Scientific Research Infrastructure								
Partner Name:	RapidMiner GmbH / Altair RapidMiner (RM)							
Project Role:	commercial development and integration							
Target Groups:	companies and organizations across all application domains and sectors							
Notes	Within the CREXDATA project, RapidMiner extended the Altair RapidMiner platform for the CREXDATA project by several extensions for data integration and system integration (e.g. for Kafka data stream handling, FMI weather forecast and wave height forecast integration, drone data integration, and for integrating CREXDATA system components like the HYDS ARGOS system, the BSC simulator for the health emergency use case, the FloodWaive DeepWaive simulator and the Gazebo simulator for the weather emergency use case, the Keplr simulator for maritime use case, the LORE eXplainable Artificial Intelligence (XAI) component, etc.), which widens the applicability of the Altair RapidMiner platform to new use cases and application domains, which will enable RapidMiner to enter new markets and to grow the number of users of the Altair RapidMiner platform. While these extensions are made available free of charge via the RapidMiner Marketplace, they require the underlying Altair RapidMiner platform to work and hence they will generate new platform license customers for RapidMiner for the products Altair RapidMiner AI Studio (desktop software), Altair RapidMiner AI Hub (server software), and the Altair RapidMiner Real-Time Scoring Agents (RTSA) (edge software), which will lead to additional revenue for RapidMiner. Additional revenue may be generated by related services like consulting, system integration, and configuration. OBJ Altair RapidMiner is a software platform for system integration, data handling, data analytics, machine learning (ML), artificial intelligence (AI), and process automation. Altair RapidMiner AI Studio (desktop software) is used for visual workflow design and Altair RapidMiner AI Hub (server) and Real-Time Scoring Agents (RTSA) (edge) are used for running and automating workflows.							
Key Exploitable Results								
ID	Exploitation Plan	Potential customers	Benefit to customers	Consultancy service / Academic exploitation / Commercial exploitation	Estimated maintenance cost	Estimated yearly selling price	Target group	Competitive advantage of the solution
RM – 1	RapidMiner implemented a new RapidMiner Extension for Kafka Data Stream Handling for reading from and writing to Kafka streams. Readers start from the beginning or from the end of the stream (i.e. most recent events). RapidMiner will distribute the extension free of charge via the RapidMiner	Companies and organizations wanting to process and/or analyse	Extended applicability of data analytics to data streams, including	Commercial exploitation: License fees for the underlying RapidMiner platform	5000€/year	The extension will be freely available on the RapidMiner	Companies and organizations which want to process and/or analyse	Thanks to the easy-to-use graphical user interface (GUI) of RapidMiner AI Studio, this extension enables users

	Marketplace to attract additional platform users and customers. Since this extension requires the underlying RapidMiner platform, there is an incentive to use the commercial RapidMiner platform and to become a paying customer. Hence, the functionality added by this extension is expected to attract new users for the underlying RapidMiner platform and hence additional license revenue for this underlying platform.	data streams	real-time analysis of very large and fast data streams			Market-place but requires RM AI Studio or RM AI Hub or RM RTSA to be used, for which the license fees start at 10k€/year per customer.	data streams	to process and analyze data streams without coding via simple drag & drop of operators, hiding the complexity of the stream handling from the user.
RM – 2	RapidMiner implemented a new RapidMiner Extension for integrating the FMI forecasts, i.e. weather forecasts and wave height forecasts. RapidMiner will distribute the extension free of charge via the RapidMiner Marketplace to attract additional platform users and customers. Since this extension requires the underlying RapidMiner platform, there is an incentive to use the commercial RapidMiner platform and to become a paying customer. Hence, the functionality added by this extension is expected to attract new users for the underlying RapidMiner platform and hence additional license revenue for this underlying platform.	Compa-nies and organiza-tions wanting to leverage weather forecasts or wave height forecasts in their data analytics processes, e.g. for weather emergency use cases, maritime	Capability to integrate weather forecasts and/or wave height forecasts into data analytics processes	Commercial exploitation: License fees for the underlying RapidMiner platform	3000€/year	The extension will be freely available on the Rapid-Miner Market-place but requires RM AI Studio or RM AI Hub or RM RTSA to be used, for which the license	Companies and organiza-tions wanting to leverage weather forecasts or wave height forecasts in their data analytics processes, e.g. for weather emergency use cases, maritime	Thanks to the easy-to-use graphical user interface (GUI) of RapidMiner AI Studio, this extension enables users to integrate weather forecasts and wave height forecasts into their data analytics processes without coding

		use cases, agricultural use cases, etc.				fees start at 10k€/year per customer.	use cases, agricultural use cases, etc.	via simple drag & drop of operators into the visual workflow.
RM – 3	RapidMiner implemented a new RapidMiner Extension for integrating the DRZ drone data. RapidMiner will distribute the extension free of charge via the RapidMiner Marketplace to attract additional platform users and customers. Since this extension requires the underlying RapidMiner platform, there is an incentive to use the commercial RapidMiner platform and to become a paying customer. Hence, the functionality added by this extension is expected to attract new users for the underlying RapidMiner platform and hence additional license revenue for this underlying platform.	Companies and organiza-tions wanting to leverage drone data in their data analytics processes, e.g. for weather emergency use cases, maritime use cases, agricultural use cases, etc.	Capability to integrate drone data into data analytics processes	Commercial exploitation: License fees for the underlying RapidMiner platform	3000€/year	The extension will be freely available on the Rapid-Miner Market-place but requires RM AI Studio or RM AI Hub or RM RTSA to be used, for which the license fees start at 10k€/year per customer.	Companies and organiza-tions wanting to leverage drone data in their data analytics processes, e.g. for weather emergency use cases, maritime use cases, agricultural use cases, etc.	Thanks to the easy-to-use graphical user interface (GUI) of RapidMiner AI Studio, this extension enables users to integrate drone data into their data analytics processes without coding via simple drag & drop of operators into the visual workflow.
RM – 4	RapidMiner implemented a new RapidMiner Extension for connecting to and communicating with the ARGOS system developed by HYDS. Custom operators wrap the complexity of the	Companies and organiza-tions wanting to	Capability to integrate additional data	Commercial exploitation: License fees for the underlying	3000€/year	The extension will be freely available	Companies and organiza-tions wanting to	Thanks to the easy-to-use graphical user interface (GUI) of RapidMiner

	underlying communication between the CREXDATA system (RapidMiner platform) and the ARGOS system, so that the system can be easily added to data processing workflows within the graphical user interface (GUI) of RapidMiner AI Studio for visually designing such workflows. RapidMiner will distribute this extension free of charge via the RapidMiner Marketplace to attract additional platform users and customers. Since this extension requires the underlying RapidMiner platform, there is an incentive to use the commercial RapidMiner platform and to become a paying customer. Hence, the functionality added by this extension is expected to attract new users for the underlying Altair RapidMiner platform and hence additional license revenue for this underlying platform.	leverage additional data sources, simulation results, and forecasts in ARGOS, especially for weather emergency use cases	sources, simulation results, and forecasts into ARGOS via Rapid-Miner as well as capability to seamless-ly use ARGOS data in Rapid-Miner workflows	RapidMiner platform		on the Rapid-Miner Market-place but requires RM AI Studio or RM AI Hub or RM RTSA to be used, for which the license fees start at 10k€/year per customer.	leverage additional data sources, simulation results, and forecasts in ARGOS, especially for weather emergency use cases	AI Studio, this extension enables users to integrate ARGOS data into their data analytics processes without coding via simple drag & drop of operators into the visual workflow, and to leverage additional data sources, simulation results and forecasts in ARGOS.
RM – 5	BSC and RapidMiner implemented a new RapidMiner Extension for connecting to and communicating with the health emergency simulator developed and used by BSC. Custom operators wrap the complexity of the underlying communication between the CREXDATA system (RapidMiner platform) and the BSC simulator, so that the simulator can be easily added to data processing workflows within the graphical user interface (GUI) of	Companies and organiza-tions wanting to run and control the BSC simulator from Rapid-Miner	Capability to seamless-ly integrate BSC simulator invocation s into Rapid-Miner workflows,	Commercial exploitation: License fees for the underlying RapidMiner platform	3000€/year	The extension will be freely available on the Rapid-Miner Market-place but requires RM AI	Companies and organiza-tions wanting to run and control the BSC simulator from RapidMiner workflows,	Thanks to the easy-to-use graphical user interface (GUI) of RapidMiner AI Studio, this extension enables users to integrate BSC simulator invocations

	RapidMiner AI Studio for visually designing such workflows. RapidMiner will distribute this extension free of charge via the RapidMiner Marketplace to attract additional platform users and customers. Since this extension requires the underlying Altair RapidMiner platform, there is an incentive to use the commercial RapidMiner platform and to become a paying customer. Hence, the functionality added by this extension is expected to attract new users for the underlying RapidMiner platform and hence additional license revenue for this underlying platform.	workflows, e.g. for optimizing simulation parameters using visual Rapid-Miner workflows and optimiza-tion operators	to optimize simulation parameter s from RapidMine r, and to collect the simulation results in Rapid-Miner			Studio or RM AI Hub or RM RTSA to be used, for which the license fees start at 10k€/year per customer.	e.g. for optimizing simulation parameters using visual RapidMiner workflows and optimiza-tion operators	and results into their data analytics processes without coding via simple drag & drop of operators into the visual workflow, and to optimize simulation parameters and collect simulation results.
RM – 6	RapidMiner implemented a new RapidMiner extension for integrating the FloodWaive DeepWaive simulator into RapidMiner workflows. Custom operators wrap the complexity of the underlying communication between the CREXDATA system (RapidMiner platform) and the FloodWaive simulator, so that the simulator can be easily added to data processing workflows within the graphical user interface (GUI) of RapidMiner AI Studio for visually designing such workflows. RapidMiner will distribute this extension free of charge via the RapidMiner Marketplace to attract additional platform users and customers. Since this extension requires the underlying Altair RapidMiner	Companies and organiza-tions wanting to run the Flood-Waive simulator within Rapid-Miner workflows and to leverage the simulation results in	Capability to seamless-ly integrate Flood-Waive simulator invocation s into Rapid-Miner workflows and to make the simulation results usable	Commercial exploitation: License fees for the underlying RapidMiner platform	3000€/year	The extension will be freely available on the Rapid-Miner Market-place but requires RM AI Studio or RM AI Hub or RM RTSA to be used, for which	Companies and organiza-tions wanting to run the Flood-Waive simulator within Rapid-Miner workflows and the leverage the simulation results in	Thanks to the easy-to-use graphical user interface (GUI) of RapidMiner AI Studio, this extension enables users to integrate FloodWaive simulator invocations and results into their data analytics processes

	platform, there is an incentive to use the commercial RapidMiner platform and to become a paying customer. Hence, the functionality added by this extension is expected to attract new users for the underlying RapidMiner platform and hence additional license revenue for this underlying platform.	the CREX-DATA system (or within the HYDS ARGOS system)	within Rapid-Miner and for other systems like the CREX-DATA system and HYDS ARGOS			the license fees start at 10k€/year per customer.	the CREX-DATA system (or within the ARGOS system)	without coding via simple drag & drop of operators into the visual workflow, and to leverage simulation results within RapidMiner and other systems like the CREXDATA system and HYDS ARGOS.
RM – 7	RapidMiner and UPB implemented a new RapidMiner extension for integrating the Gazebo simulator into RapidMiner workflows. Custom operators wrap the complexity of the underlying communication between the CREXDATA system (RapidMiner platform) and the Gazebo simulator, so that the simulator can be easily added to data processing workflows within the graphical user interface (GUI) of RapidMiner AI Studio for visually designing such workflows. RapidMiner and UPB will distribute this extension free of charge via the RapidMiner Marketplace to attract additional	Companies and organiza-tions wanting to run the Gazebo simulator within Rapid-Miner workflows and to leverage the simulation	Capability to seamless-ly integrate Gazebo simulator invocation s into Rapid-Miner workflows and to make the simulation results	Commercial exploitation: License fees for the underlying RapidMiner platform	3000€/year	The extension will be freely available on the Rapid-Miner Market-place but requires RM AI Studio or RM AI Hub or RM RTSA to	Companies and organiza-tions wanting to run the Gazebo simulator within Rapid-Miner workflows and to leverage the simulation	Thanks to the easy-to-use graphical user interface (GUI) of RapidMiner AI Studio, this extension enables users to integrate Gazebo simulator invocations and results into their data analytics

	platform users and customers. Since this extension requires the underlying Altair RapidMiner platform, there is an incentive to use the commercial RapidMiner platform and to become a paying customer. Hence, the functionality added by this extension is expected to attract new users for the underlying RapidMiner platform and hence additional license revenue for this underlying platform.	results in the CREX-DATA system or Simulation HyperSuite	usable within Rapid-Miner and for other systems like the CREX-DATA system and the Simulation Hyper-Suite			be used, for which the license fees start at 10k€/year per customer.	results in the CREX-DATA system or Simulation HyperSuite	processes without coding via simple drag & drop of operators into the visual workflow, and to leverage simulation results within RapidMiner and other systems like the CREXDATA system and the Simulation HyperSuite
RM – 8	RapidMiner implemented a new RapidMiner extension for integrating the Kpler Maritime Simulator into RapidMiner workflows. Custom operators wrap the complexity of the underlying communication between the CREXDATA system (RapidMiner platform) and the Kpler Maritime Simulator, so that the simulator can be easily added to data processing workflows within the graphical user interface (GUI) of RapidMiner AI Studio for visually designing such workflows. RapidMiner will distribute this extension free of charge via the RapidMiner	Companies and organiza-tions wanting to run the Kpler Maritime Simulator within Rapid-Miner workflows and to leverage	Capability to seamless-ly integrate Kpler Maritime Simulator invocation s into Rapid-Miner workflows and to make the	Commercial exploitation: License fees for the underlying RapidMiner platform	3000€/year	The extension will be freely available on the Rapid-Miner Market-place but requires RM AI Studio or RM AI Hub or RM	Companies and organiza-tions wanting to run the Kpler Maritime Simulator within Rapid-Miner workflows and to leverage	Thanks to the easy-to-use graphical user interface (GUI) of RapidMiner AI Studio, this extension enables users to integrate Kpler Maritime Simulator invocations and results into their data

	Marketplace to attract additional platform users and customers. Since this extension requires the underlying Altair RapidMiner platform, there is an incentive to use the commercial RapidMiner platform and to become a paying customer. Hence, the functionality added by this extension is expected to attract new users for the underlying RapidMiner platform and hence additional license revenue for this underlying platform.	the simulation results in Rapid-Miner or in the CREX-DATA system	simulation results usable within Rapid-Miner and for other systems like the CREX-DATA system			RTSA to be used, for which the license fees start at 10k€/year per customer.	the simulation results in Rapid-Miner or in the CREX-DATA system	analytics processes without coding via simple drag & drop of operators into the visual workflow, and to leverage simulation results within RapidMiner and other systems like the CREXDATA system.
RM – 9	RapidMiner and UPB implemented a new RapidMiner extension for integrating the Simulation HyperSuite and RapidMiner. RapidMiner and UPB will distribute this extension free of charge via the RapidMiner Marketplace to attract additional platform users and customers. Since this extension requires the underlying Altair RapidMiner platform, there is an incentive to use the commercial RapidMiner platform and to become a paying customer. Hence, the functionality added by this extension is expected to attract new users for the underlying RapidMiner platform and	Companies and organiza-tions that would like to use the Simulation Hyper-Suite to easily configure and the various simulators related to the	Capability to integrate the Simulation Hyper-Suite and Rapid-Miner via web services with underlying Rapid-Miner workflows	Commercial exploitation: License fees for the underlying RapidMiner platform	3000€/year	The extension will be freely available on the Rapid-Miner Market-place but requires RM AI Studio or RM AI Hub or RM RTSA to	Companies and organiza-tions that would like to use the Simulation Hyper-Suite to easily configure and the various simulators related to the weather emergency	The Simulation HyperSuite eases the configuration and use of the underlying simulators, hiding the complexity of their respective APIs. The RapidMiner processes in this RapidMiner extension and

	hence additional license revenue for this underlying platform.	weather emergency use case, i.e. Flood-Waive Deep-Waive, Gazebo, etc.	on a Rapid-Miner AI Hub server that can be leveraged by the Simulation Hyper-Suite for running the simulators via Rapid-Miner			be used, for which the license fees start at 10k€/year per customer.	use case, i.e. Flood-Waive Deep-Waive, Gazebo, etc.	the RapidMiner AI Hub web services using them enable the Simulation HyperSuite to invoke the simulators via RapidMiner AI Hub web services.
RM – 10	RapidMiner implemented a new RapidMiner extension for integrating the Complex Event Forecasting (CEF) component developed by NCSR. RapidMiner will distribute this extension free of charge via the RapidMiner Marketplace to attract additional platform users and customers. Since this extension requires the underlying Altair RapidMiner platform, there is an incentive to use the commercial RapidMiner platform and to become a paying customer. Hence, the functionality added by this extension is expected to attract new users for the underlying RapidMiner platform and	Companies and organiza-tions wanting to use Complex Event Forecas-ting within Rapid-Miner workflows, e.g. for maritime use cases, weather	Capability to leverage Complex Event Forecas-ting in Rapid-Miner data analytics workflows, i.e. without the need to code, simply using visually	Commercial exploitation: License fees for the underlying RapidMiner platform	5000€/year	The extension will be freely available on the Rapid-Miner Market-place but requires RM AI Studio or RM AI Hub or RM RTSA to be used,	Companies and organiza-tions wanting to use Complex Event Forecas-ting within Rapid-Miner workflows, e.g. for maritime use cases, weather	Thanks to the easy-to-use graphical user interface (GUI) of RapidMiner AI Studio, this extension enables users to leverage Complex Event Forecasting in their data analytics processes without coding via simple drag

	hence additional license revenue for this underlying platform.	emergency use cases, fraud detection, etc.	designed workflows.			for which the license fees start at 10k€/year per customer.	emergency use cases, fraud detection, etc.	& drop of operators into the visual workflow, and to leverage the results within RapidMiner and other systems like the CREXDATA system.
RM – 11	BSC and RapidMiner implemented a new RapidMiner extension for integrating the CREXDATA component for social media monitoring and text analytics developed by BSC into RapidMiner. BSC and RapidMiner will distribute this extension free of charge via the RapidMiner Marketplace to attract additional platform users and customers. Since this extension requires the underlying Altair RapidMiner platform, there is an incentive to use the commercial RapidMiner platform and to become a paying customer. Hence, the functionality added by this extension is expected to attract new users for the underlying RapidMiner platform and hence additional license revenue for this underlying platform.	Companies and organizations wanting to use Social Media Monitoring and Text Analytics within RapidMiner workflows, e.g. for weather emergency use cases, brand monitoring, or competi-	Capability to integrate Social Media Monitoring and Text Analytics into RapidMiner workflows, e.g. for weather emergency use cases, brand monitoring or	Commercial exploitation: License fees for the underlying RapidMiner platform	5000€/year	The extension will be freely available on the RapidMiner Marketplace but requires RM AI Studio or RM AI Hub or RM RTSA to be used, for which the license fees start at	Companies and organizations wanting to use Social Media Monitoring and Text Analytics within RapidMiner workflows, e.g. for weather emergency use cases, brand monitoring or competi-	Thanks to the easy-to-use graphical user interface (GUI) of RapidMiner AI Studio, this extension enables users to leverage Social Media Monitoring and Text Analytics in their data analytics processes without coding via simple drag & drop of operators into the visual workflow, and

		tive intelligence	competi-tive			10k€/year per customer.	tive intelligence	to leverage the results within RapidMiner and other systems like the CREXDATA system.
RM – 12	CNR and RapidMiner implemented a new RapidMiner extension for integrating the eXplainable Artificial Intelligence (XAI) tool LORE developed by CNR into RapidMiner. CNR and RapidMiner will distribute this extension free of charge via the RapidMiner Marketplace to attract additional platform users and customers. Since this extension requires the underlying Altair RapidMiner platform, there is an incentive to use the commercial RapidMiner platform and to become a paying customer. Hence, the functionality added by this extension is expected to attract new users for the underlying RapidMiner platform and hence additional license revenue for this underlying platform.	Companies and organiza-tions that would like to better understand the predictions and recommen dations of their AI models by using XAI (LORE) within Rapid-Miner workflows.	Capability to leverage XAI (LORE) within Rapid-Miner within data analytics workflows, i.e. to receive under-standable explana-tions of predictions and recommen dations generated by AI models	Commercial exploitation: License fees for the underlying RapidMiner platform	3000€/year	The extension will be freely available on the Rapid-Miner Market-place but requires RM AI Studio or RM AI Hub or RM RTSA to be used, for which the license fees start at 10k€/year per customer.	Companies and organiza-tions that would like to better understand the predictions and recommend ations of their AI models by using XAI (LORE) within Rapid-Miner workflows.	Thanks to the easy-to-use graphical user interface (GUI) of RapidMiner AI Studio, this extension enables users to leverage XAI (LORE) in their data analytics processes without coding via simple drag & drop of operators into the visual workflow, and to leverage the explanations of predictions and recommendati

								ons generated by AI models within RapidMiner and other systems like the CREXDATA system.
RM – 13	RapidMiner implemented a new RapidMiner extension for integrating the optimizer developed by NCSR into RapidMiner. RapidMiner will distribute this extension free of charge via the RapidMiner Marketplace to attract additional platform users and customers. Since this extension requires the underlying Altair RapidMiner platform, there is an incentive to use the commercial RapidMiner platform and to become a paying customer. Hence, the functionality added by this extension is expected to attract new users for the underlying RapidMiner platform and hence additional license revenue for this underlying platform.	Companies and organiza-tions that would like to use the NCSR optimizer within Rapid-Miner workflows, e.g. to optimize the configurati on of flood walls during floods in city areas in weather	Capability to use the NCSR optimizer within Rapid-Miner workflows, e.g. to optimize the configurati on of flood walls during floods in city areas in weather emer-gency use cases.	Commercial exploitation: License fees for the underlying RapidMiner platform	3000€/year	The extension will be freely available on the Rapid-Miner Market-place but requires RM AI Studio or RM AI Hub or RM RTSA to be used, for which the license fees start at 10k€/year per customer.	Companies and organiza-tions that would like to use the NCSR optimizer within Rapid-Miner workflows, e.g. to optimize the configuratio n of flood walls during floods in city areas in weather	Thanks to the easy-to-use graphical user interface (GUI) of RapidMiner AI Studio, this extension enables users to leverage the NCSR optimizer in their data analytics processes without coding via simple drag & drop of operators into the visual workflow, and to leverage the results within

		emergency use cases.					emergency use cases.	RapidMiner and other systems like the CREXDATA system.
RM – 14	RapidMiner implemented a new RapidMiner extension for integrating the visualization tool developed by Fraunhofer IAIS and RapidMiner. RapidMiner will distribute this extension free of charge via the RapidMiner Marketplace to attract additional platform users and customers. Since this extension requires the underlying Altair RapidMiner platform, there is an incentive to use the commercial RapidMiner platform and to become a paying customer. Hence, the functionality added by this extension is expected to attract new users for the underlying RapidMiner platform and hence additional license revenue for this underlying platform	Companies and organizations that would like to use the Fraunhofer IAIS visualization tools on data and predictions processed in or generated by RapidMiner, e.g. for health emergency use cases	Capability to leverage RapidMiner (for data integration and machine learning) and the Fraunhofer visualization tool in combination, offering an easy-to-use way of configuring the visualization tool in RapidMiner AI Studio GUI and for	Commercial exploitation: License fees for the underlying RapidMiner platform	3000€/year	The extension will be freely available on the RapidMiner Marketplace but requires RM AI Studio or RM AI Hub or RM RTSA to be used, for which the license fees start at 10k€/year per customer.	Companies and organizations that would like to use the Fraunhofer IAIS visualization tools on data and predictions processed in or generated by RapidMiner, e.g. for health emergency use cases	Capability to leverage RapidMiner (for data integration, machine learning, etc.) and the Fraunhofer visualization tool in combination, offering an easy-to-use way of configuring the visualization tool in the RapidMiner AI Studio GUI and for passing data from RapidMiner to the Fraunhofer tool for visualization.

			passing data from Rapid-Miner to the Fraun-hofer tool for visualizations.					
RM – 15	The CREXDATA platform combines system components of all project partners. The Altair RapidMiner platform, an existing Altair product, was extended to meet the requirements of the CREXDATA project. While the RapidMiner extensions newly developed for the CREXDATA platform (RapidMiner platform) by RapidMiner and the CREXDATA project partners will be made open source and freely available via the RapidMiner marketplace, the previously existing Altair RapidMiner platform itself is available in different versions, including an open source version and a more powerful enterprise version. The enterprise version is not open source and requires users to pay license fees. Companies and organizations wanting to use the CREXDATA system need to acquire licenses for all commercial components of the CREXDATA system they would like to use, e.g. for HYDS ARGOS, the FloodWaive DeepWaive	Companies and organiza-tions faced with complex emergency situations or applica-tions and the need to integrate data from distributed multi-modal data sources, simulation results, and predictions generated by machine learning into one	Easy-to-use platform for integrating data from distributed multi-modal data sources, simulation results, and predic-tions generated by machine learning into for handling weather emer-gencies,	Commercial exploitation: License fees for the underlying RapidMiner platform and for the other commercial CREXDATA components like e.g. HYDS ARGOS, the FloodWaive DeepWaive simulator, the Kpler maritime simulator, etc.	Since the Altair RapidMiner platform and its products AI Studio, AI Hub, and Real-Time Scoring Agents (RTSA) are existing Altair products, no additional maintenance costs are caused for these products by the CREXDATA system, i.e. the maintenance costs are	Depend-ing on which Altair RapidMine r platform componen ts / products the customers would like to use, they have to pay license fees for RM AI Studio (visual workflow designer), RM AI Hub (server),	Companies and organiza-tions faced with complex emergency situations or applica-tions and the need to integrate data from distributed multi-modal data sources, simulation results, and predictions generated by machine learning into one easy-to-use	Easy-to-use platform for integrating data from distributed multi-modal data sources, simulation results, and predictions generated by machine learning into for handling weather emergencies, health emergencies, maritime use cases, etc.

	simulator, the Kpler maritime simulator, RapidMiner AI Studio (visual workflow designer), RapidMiner AI Hub (server), RapidMiner Real-Time Scoring Agents (RTSA) (edge), etc.	easy-to-use platform for handling weather emer-gencies, health emer-gencies, maritime use cases, etc.	health emer-gencies, maritime use cases, etc.		covered by the license fees for the products.	and/or RM Real-Time Scoring Agents (RTSA), for which the license fees start at 10k€/year per customer.	platform for handling weather emer-gencies, health emer-gencies, maritime use cases, etc.	

Table 45: Exploitation plan of RM

Scientific Research Infrastructure							
Partner Name:	RapidMiner GmbH / Altair RapidMiner (RM)						
Project Role:	commercial development and integration						
Target Groups:	companies and organizations across all application domains and sectors						
Notes	-						
Key Exploitable Results							
ID	Technology Readiness Level (1-9)	Gaps until market readiness	Resources & budget requirements	Technical Risks & barriers	Code/ Solution commented?	Storage location of all data of the solution	Contact person
RM – 1	TRL 7	More extensive testing beyond the CREXDATA use cases	12000€	No technical barriers or risks expected	Yes	Source Code publically available via the CREXDATA Source Code Repository (GitHub). Data passed on to and from RapidMiner via Kafka data streams is streamed via Kafka clusters. These data streams can be encrypted. This extension itself does not store any stream data, but enables read	Ralf Klinkenberg (rklinkenberg@altair.com)

						and write access to such streams.	
RM – 2	TRL 7	More extensive testing beyond the CREXDATA use cases	8000€	No technical barriers or risks expected	Yes	Source Code publically available via the CREXDATA Source Code Repository (GitHub). FMI forecast data is provided by FMI, but can also be stored on the RapidMiner AI Hub server, i.e. within the overall CREXDATA system.	Ralf Klinkenberg (rklinkenberg@altair.com)
RM – 3	TRL 7	More extensive testing beyond the CREXDATA use cases	8000€	No technical barriers or risks expected	Yes	Source Code publically available via the CREXDATA Source Code Repository (GitHub). Data from the drone sensor data streams is currently not	Ralf Klinkenberg (rklinkenberg@altair.com)

						stored but only processed using data stream processing and passed on to other CREXDATA system components.	
RM – 4	TRL 7	More extensive testing beyond the CREXDATA use cases	8000€	No technical barriers or risks expected	Yes	Source Code publically available via the CREXDATA Source Code Repository (GitHub). Data from ARGOS are currently not stored in RapidMiner but only passed on to other CREXDATA system components.	Ralf Klinkenberg (rklinkenberg@altair.com)
RM – 5	TRL 7	More extensive testing beyond the CREXDATA use cases	12000€	Accessing BSC simulators running on supercomputers behind firewalls from outside systems like RapidMiner AI Hub or RapidMiner AI	Yes	Source Code publically available via the CREXDATA Source Code	Ralf Klinkenberg (rklinkenberg@altair.com)

				Studio can be challenging		Repository (GitHub). Data storage: The simulator configuration, parameters, and simulation results are stored in RapidMiner to find the best simulation parameters.	
RM – 6	TRL 7	More extensive testing beyond the CREXDATA use cases	8000€	No technical barriers or risks expected	Yes	Source Code publically available via the CREXDATA Source Code Repository (GitHub). Data and simulation results from the FloodWaive simulator are currently not stored in RapidMiner but only passed on to other CREXDATA	Ralf Klinkenberg (rklinkenberg@altair.com)

						system components.	
RM – 7	TRL 7	More extensive testing beyond the CREXDATA use cases	8000€	No technical barriers or risks expected	Yes	Source Code publically available via the CREXDATA Source Code Repository (GitHub). Data and simulation results from the Gazebo simulator are currently not stored in RapidMiner but only passed on to other CREXDATA system components.	Ralf Klinkenberg (rklinkenberg@altair.com)
RM – 8	TRL 7	More extensive testing beyond the CREXDATA use cases	8000€	No technical barriers or risks expected	Yes	Source Code publically available via the CREXDATA Source Code Repository (GitHub). Data from the Kpler Maritime	Ralf Klinkenberg (rklinkenberg@altair.com)

						Simulator are currently not stored in RapidMiner but only passed on to other CREXDATA system components.	
RM – 9	TRL 7	More extensive testing beyond the CREXDATA use cases	12000€	No technical barriers or risks expected	Yes	Source Code publically available via the CREXDATA Source Code Repository (GitHub). Data from the Simumlation HyperSuite are currently not stored in RapidMiner but only passed on to other CREXDATA system components.	Ralf Klinkenberg (rklinkenberg@altair.com)
RM – 10	TRL 7	More extensive testing beyond the CREXDATA use cases	12000€	No technical barriers or risks expected	Yes	Source Code publically available via the CREXDATA Source Code	Ralf Klinkenberg (rklinkenberg@altair.com)

						Repository (GitHub). Data and results from the Complex Event Forecasting can be stored in RapidMiner or passed on to other CREXDATA system components, depending on the user preference.	
RM – 11	TRL 7	More extensive testing beyond the CREXDATA use cases	12000€	No technical barriers or risks expected	Yes	Source Code publically available via the CREXDATA Source Code Repository (GitHub). Text data collected by the BSC Social Media Monitoring and Text Analytics component are stored in this component, but	Ralf Klinkenberg (rklinkenberg@altair.com)

						not in RapidMiner. The text analytics results are currently also not stored in RapidMiner but only passed on to other CREXDATA system components.	
RM – 12	TRL 7	More extensive testing beyond the CREXDATA use cases	12000€	No technical barriers or risks expected	Yes	Source Code publically available via the CREXDATA Source Code Repository (GitHub). Data storage: Explanations generated by the XAI component (LORE) are currently not stored in RapidMiner but only passed on to other CREXDATA system components, but	Ralf Klinkenberg (rklinkenberg@altair.com)

						could be stored if desired by the user.	
RM – 13	TRL 7	More extensive testing beyond the CREXDATA use cases	8000€	No technical barriers or risks expected	Yes	Source Code publically available via the CREXDATA Source Code Repository (GitHub). Data and results from the NCSR Optimizer are currently not stored in RapidMiner but only passed on to other CREXDATA system components.	Ralf Klinkenberg (rklinkenberg@altair.com)
RM – 14	TRL 7	More extensive testing beyond the CREXDATA use cases	12000€	No technical barriers or risks expected	Yes	Source Code publically available via the CREXDATA Source Code Repository (GitHub). Data for the Fraunhofer IAIS visualization	Ralf Klinkenberg (rklinkenberg@altair.com)

						component are currently not stored in RapidMiner but only passed on to other CREXDATA system components.	
RM – 15	TRL 7 (CREXDATA System) TRL 9 (RapidMiner Platform)	More extensive testing of the overall CREXDATA system beyond the CREXDATA use cases	140000€	Systems consisting of many components from many different software providers and research organizations can pose challenges, e.g. when updates / version changes occur, different components require different versions of underlying software libraries or tools, etc. In addition to these potential technical challenges, there may be organizational challenges when so many partners need to agree on the licensing and	Yes	The source code of the open source version of RapidMiner AI Studio is available on the internet. The source code of the enterprise version of RapidMiner AI Studio and of RapidMiner AI Hub and of the RapidMiner Real-Time Scoring Agents (RTSA) is not publically available. Which data are stored during	Ralf Klinkenberg (rklinkenberg@altair.com)

				pricing and go-to-market of the overall system. Since the technical integration and the collaboration between all involved partners in the CREXDATA project worked very well, the above challenges seem feasible.		the use of the CREXDATA system and where, depends on the configuration of the system.	

6.3.12 Technical University of Crete (TUC)

Table 46: Exploitation plan of TUC

Scientific research infrastructure									
Partner Name:	Technical University of Crete (TUC)								
Project Role:	research and development partner								
Target groups	Public institutions, Private individualsstart-up, Scientific community,								
Notes	-								
Key Exploitable Results									
ID	Name of the Key Exploitable Result	Other involved partners	If yes, who?	Joint ownership	If yes, who?	Standalone Result	Integrated in Crexdata System	Intellectual Property Strategy	Type of Result (Algorithm/ Model/ Method/ Process/ Software/ Knowledge)
TUC – 1	The idea described in Impact section of the submitted proposals is for technical partners to give their results open source and provide consulting or customization afterwards to potential adopters							Open Source in full without implementation guide	
TUC – 2	Real time explainability								
TUC – 3	CREXDATA Optimizer	None	None	No	No	Both standalone and Integrated in RM AI Studio	X	Open Source License AGPL3.0	Algorithm: X, Software: X
TUC – 4	AR Application	None	None	No	No	Both standalone and Integrated in RM AI Studio	X	Open Source License AGPL3.0	Algorithm: X, Software: X
TUC – 5	EdgeToCloud Extension	YES	Rapid Miner + X	No	No	Integrated into RM AI Studio	X	Open Source License AGPL3.0	Software: X

TUC – 6	Federated Learning Component	None	None	None	None	A standalone version of the component will be available.		The component will continue to be available as Open Source for researchers.	Algorithm: X, Software: X

Table 47: Exploitation plan of TUC

Scientific research infrastructure								
Partner Name:	Technical University of Crete (TUC)							
Project Role:	research and development partner							
Target groups	Public institutions, Private individualsstart-up, Scientific community							
Notes	-							
Key Exploitable Results								
ID	Exploitation Plan	Potential customers	Benefit to customers	Consultancy service/ Academic exploitation/ Commercial exploitation	Estimated maintenance cost	Estimated yearly selling price	Target group	Competitive advantage of the solution
TUC – 1	The exploitation of project results will take place partly through a spin-off and the founding of a start-up. Publication of the results is planned in academic journals. Financial and technical support, as well as available resources and computing capacity, are required for implementation. Project outcomes are typically provided and							

	then further developed in subsequent projects, rather than stopping the distribution process. To enable comprehensive exploitation, better integration of the various components is needed. Individual components can be exploited more promptly in isolation.							
TUC – 2	This belongs only to NCSR and maybe CNR. It depends on what you mean.							
TUC – 3	Open-source, extensions in future EU projects	Telecom providers, Smart Cities, Smart Factories, Maritime Authorities and Companies, First Responders,	Reduced infrastructure, administrative and maintenancy costs, more rapid analytics results	Consultancy Service: X Academic Exploitation: X Commercial exploitation: Open source, selling customization and consultancy	N/A (no license fee; revenues expected via consultancy/customization).	N/A (open source; revenue from consultancy/ customizatio n)	Telecom providers, Smart Cities, Smart Factories, Maritime Authorities and Companies, First Responders,	state-of-the-art research incorporated in a commercial platform (Altair AI studio)
TUC – 4	TUC as leader for technical development, created several	Maritime Authorities and Companies,	Increased situation awareness,	Academic Exploitation: X	N/A (no license fee; revenues	N/A (open source; revenue from	Maritime Authorities and	

	systems involving Augmented Reality (AR) technologies for head-worn devices in critical action situations. These are: An AR system for navigation, team co-ordination, and real-time data visualization in firefighting operations; a head-worn AR system for real-time navigation assistance and event forecasting in maritime operations; an AR system for real-time decision-making in flood emergencies and in co-ordination with drone operators. TUC as leader and the involved CREXDATA partners have extensively published the innovations of the AR systems in major international conferences, as well as demonstrated their efficiency in large-scale trials in Austria and Germany. The	First Responders	improved decision making	Commercial exploitation: Open source, selling customization and consultancy	expected via consultancy/customization).	consultancy/ customizatio n)	Compan ies, First Respon ders,	

	plan is to utilize these systems in future EU projects as well as make them available for European first responders to use as research tools for critical action scenarios.							
TUC – 5	TUC created the EdgeToCloud Extension, which allows Federated Processing at IoT devices at the edge, as well as Federated Learning over federated topologies, and workflow optimization over such topologies. The extension significantly extended a prior RapidMiner extension (the Streaming Extension, originally developed by Altair RapidMiner), which provided support for executing workflows on Big Data clusters.	CREXDATA platform adopters	Extends CREXDATA over IoT topologies	Consultancy Service: X Academic Exploitation: X Commercial exploitation: no	No	No	Researchers, students, system integrators.	

	Other partners that contributed to the Federated extension are: - Altair RapidMiner, which migrated the Streaming Extension to the current version of RapidMiner AI Studio and RapidMiner AI Hub and developed and implemented a new extension for Kafka data stream handling. - University of the Aegean which developed and implemented the Multi-Data Fusion Toolbox. The involved CREXDATA partners intend to distribute the EdgeToCloud Extenson free of charge via the RapidMiner Marketplace and to utilize it in future EU projects.							
TUC – 6	The Federated Learning (FL) component, built on top of PyTorch and	Researchers, students, system integrators.	End-to-end low-communicatio n Federated	Academic Exploitation: As a research testbed for new FL techniques,	N/A	N/A	Researc hers, students , system	Low-cost deployment of Federated

	Flower, will be further developed to include more advanced and efficient FL algorithms and to support a wider range of hardware platforms. TUC intends to leverage this component as a research platform in upcoming EU projects, with the goal of progressively increasing its Technology Readiness Level (TRL) to level 7. Beyond its current focus on deep neural networks for computer vision and large language models (LLMs), the system will be extended to enable the training of Neural Radiance Fields (NeRFs) in federated environments. Additionally, the component will be expanded to support cross-device federated learning, integrating the auto-tuning techniques developed during the project.		Learning with minimum development.	as a teaching tool for graduate-level courses Commercial exploitation: N/A			integrat ors.	Learning process.

Table 48: Exploitation plan of TUC

Scientific research infrastructure							
Partner Name:	Technical University of Crete (TUC)						
Project Role:	research and development partner						
Target groups	Public institutions, Private individualsstart-up, Scientific community						
Notes	-						
Key Exploitable Results							
ID	Technology Readiness Level (1-9)	Gaps until market readiness	Resources & budget requirements	Technical Risks & barriers	Code/ Solution commented?	Storage location of all data of the solution	Contact person
TUC – 1							Nikos Giatrakos
TUC – 2							
TUC – 3	TRL-5 – TRL-6	Testing integration outside Altair RapidMiner AI Studio on existing stacks of potential target groups, Testing on more use case scenarios	Budget for integration pilots, documentation, community building, and dissemination	None foreseen	Yes	CREXDATA Repository	Nikos Giatrakos
TUC – 4	TRL-5 – TRL-6			None foreseen	Yes	CREXDATA Repository	
TUC – 5	TRL-5	None	IoT network	None foreseen	Yes	CREXDATA Repository	
TUC – 6	TRL-5	Adding new API besides the Kafka-based one.	Budget for development of planned extensions	None foreseen	Yes	CREXDATA git Repository	Vasilis Samoladas

6.3.13 University of Aegean (UoA)

Table 49: Exploitation plan of UoA

Scientific research infrastructure									
Partner Name:	University of the Aegean								
Project Role:	research and development partner								
Target groups	-								
Notes	-								
Key Exploitable Results									
ID	Name of the Key Exploitable Result	Other involved partners	If yes, who?	Joint ownership	If yes, who?	Standalone Result	Integrated in Crexdata System	Intellectual Property Strategy	Type of Result (Algorithm/ Model/ Method/ Process/ Software/ Knowledge)
UA – 1	Scientific advancements in situational awareness	No		No				Open Source	
UA – 2	Multi-modal Data Fusion Toolbox	No	X	No	X	Yes	Through the extension below	Publicly available for non-commercial use to be published after related scientific work has been submitted.	Algorithm: X, Method: X, Software: X
UA – 3	Multi-modal Data Fusion AI Studio Extension	No	X	No	X	Yes	X	Open Source	Software: X

Table 50: Exploitation plan of UoA

Scientific research infrastructure								
Partner Name:	University oft he Agean							
Project Role:	research and development partner							
Target groups	-							
Notes	-							
Key Exploitable Results								
ID	Exploitation Plan	Potential customers	Benefit to customers	Consultancy service/ Academic exploitation/ Commercial exploitation	Estimated maintenance cost	Estimated yearly selling price	Target group	Competitive advantage of the solution
UA – 1	own institution, specialised journals, Scientific community after 2 to five years after the project							
UA – 2	Real time processing system fusing streaming sensor data (such as but not limited to IoT devices, AIS, autonomous systems telemetry, computer vision detections, social media streams, biometric data etc.) and other data sources (such as but not limited to video-streams metadata, landscape and coastline static files etc.).			Academic exploitation: X				
UA – 3	Workflow designer extension installable to AI studio that supports generation of configuration & execution of Multi-modal Data Fusion Toolbox			Academic exploitation: X				

Table 51: Exploitation plan of UoA

Scientific research infrastructure							
Partner Name:	University oft he Aegean						
Project Role:	research and development partner						
Target groups	-						
Notes	-						
Key Exploitable Results							
ID	Technology Readiness Level (1-9)	Gaps until market readiness	Resources & budget requirements	Technical Risks & barriers	Code/ Solution commented?	Storage location of all data of the solution	Contact person
UA – 1							Dimitris Zissis
UA – 2							Dimitris Zissis
UA – 3							Dimitris Zissis

6.3.14 Paderborn University (UPB)

Table 52: Exploitation plan of UPB

Scientific research infrastructure									
Partner Name:	Paderborn University (UPB)								
Project Role:	research and development partner								
Target groups	academic, industry, IoT Developer,								
Notes	-								
Key Exploitable Results									
ID	Name of the Key Exploitable Result	Other involved partners	If yes, who?	Joint ownership	If yes, who?	Standalone Result	Integrated in Crexdata System	Intellectual Property Strategy	Type of Result (Algorithm/ Model/ Method/ Process/ Software/ Knowledge)
UPB – 1	EmCase simulator HyperSuite in Altair RapidMiner	Yes	RM	No	X	No	Yes	Open Source	Software
UPB – 2	Methodology for Test-Oriented Resilient Requirements Engineering	No	X	No	X	Yes	No	Open Access Publications	Method
UPB – 3	Methodology for competence-based creation of future-robust business models	No	X	No	X	Yes	No	Open Access Publications	Method
UPB – 4	EmCase Robotic Simulator Software Code	No	X	No	X	Yes	Yes	Open Source	Software
UPB – 5	EmCase Robotic Simulator Operator in Altair Rapid Miner	Yes	RM	No	X	No	Yes	Open Source	Software
UPB – 6	EmCase Flooding Simulation interface operator in Altair Rapid Miner	Yes	X	No	X	No	Yes	Open Source	Software[4]
UPB – 7	EmCase Simulator HyperSuite	No	X	No	X	Yes	Yes	Open Source	Software

[4] FloodWaive contributed as a sub-contractor for the EmCase Flooding Simulator

UPB – 8	EmCase Demonstrator System	Yes	EmCase partners, RM	Yes	EmCase Partners, RM	No	Yes	Open Source	Software
UPB – 9	EmCase Data Injector	No	X	No	X	Yes	Yes	Open Source	Software
UPB – 10	EmCase Data Injector in Altair Rapid Miner	Yes	RM: Integration	No	X	No (underlying Altair RapidMiner platform required)	Yes	Open Source	Software
UPB – 11	Uncertainty Model	No	X	No	X	Yes	No	Open Access Publication (in progress)	Method

Table 53: Exploitation plan of UPB

Scientific research infrastructure								
Partner Name:	Paderborn University (UPB)							
Project Role:	research and development partner							
Target groups	academic, industry, IoT Developer,							
Notes	-							
Key Exploitable Results								
ID	Exploitation Plan	Potential customers	Benefit to customers	Consultancy service/ Academic exploitation/ Commercial exploitation	Estimated maintenance cost	Estimated yearly selling price	Target group	Competitive advantage of the solution
UPB – 1	Collection of domain-specific simulators implemented as RapidMiner operators, embedded in RapidMiner Studio to enable simulation-based analysis within data-driven workflows.	Research institutions, universities, public authorities, infrastructure operators,	Integrated simulation and analytics, reproducible experiments, reduced	Academic exploitation, Consultancy services, Potential commercial licensing	Low–medium	Academic use free;	Researchers, data scientists, resilience	Native RapidMiner integration, modular operator-based design

		consultancy firms	effort for resilience assessments				analysts	
UPB – 2	Scientific methodology introducing test-oriented principles for resilient requirements engineering.	Academic community, R&D departments, system engineering consultancies	Improved robustness of system requirements, early detection of resilience gaps	Academic exploitation, Consultancy-based application	Very low	Not applicable (scientific publication)	Researchers, requirements engineers	Novel integration of testing and resilience engineering
UPB – 3	Scientific methodology for designing future-robust business models based on organizational competencies.	Academic institutions, innovation consultancies, strategy units	Structured development of resilient, future-oriented business models	Academic exploitation, Consultancy services	Very low	Not applicable (scientific publication)	Researchers, innovation managers, strategy consultants	Competence-based and resilience-oriented approach
UPB – 4	Gazebo-based robotic simulator for drone flight simulations considering battery, performance and environmental conditions.	Research labs, drone developers, public authorities; Companies and organizations wanting to run the Gazebo	Risk-free evaluation of drone behavior under varying conditions	Academic exploitation, Consultancy, Potential commercial licensing; Commercial exploitation: License fees for the underlying RapidMiner platform	Medium	The extension will be freely available on the Rapid-Miner Marketplace but requires RM AI Studio or RM AI Hub or RM RTSA to be used.	Robotics researchers, UAV engineers	Integration with resilience scenarios and data-driven workflows

		robotic simulator						
UPB – 5								
UPB – 6	Floodwaive-based simulator for urban flooding scenarios integrating real-time weather forecasts and sensor data.	Companies and organiza-tions wanting to run the Flood-Waive simulator within Rapid-Miner workflows and to leverage the simulation results in the CREX-DATA system (or within the HYDS ARGOS system)	Capability to seamless-ly integrate Flood-Waive simulator invocations into Rapid-Miner workflows and to make the simulation results usable within Rapid-Miner and for other systems like the CREX-DATA system and HYDS ARGOS	Academic exploitation, Consultancy services, Public-sector use; Commercial exploitation: License fees for the underlying RapidMiner platform	Medium	The extension will be freely available on the Rapid-Miner Market-place but requires RM AI Studio or RM AI Hub or RM RTSA to be used.	Comp anies and organi za-tions wantin g to run the Flood-Waive simulat or within Rapid-Miner workflo ws and the levera ge the simulat ion results in the CREX-DATA system (or within the ARGO	Thanks to the easy-to-use graphical user interface (GUI) of RapidMiner AI Studio, this extension enables users to integrate FloodWaive simulator invocations and results into their data analytics processes without coding via simple drag & drop of operators into the visual workflow, and to leverage simulation results within RapidMiner and other systems like the CREXDATA system and

							S system)	HYDS ARGOS.
UPB – 7	Web-based GUI for configuring and launching CREXDATA EmCase simulators.	Researchers, public authorities, non-technical users	Improved usability and lower entry barriers	Academic exploitation, Consultancy, Potential commercial UI licensing	Low–medium	Not applicable	Decision-makers, analysts	User-friendly orchestration of complex simulations
UPB – 8	Integrated demonstrator combining all EmCase simulators and RapidMiner extensions into a PaaS system.	Funding bodies, public authorities, research partners	Holistic demonstration of CREXDATA capabilities	Academic exploitation, Dissemination, Consultancy showcase	Low	Not applicable	Stakeholders, evaluators, policy makers	End-to-end system integration
UPB – 9	UPB engineered a new RapidMiner Extension for integrating different data types. RapidMiner will distribute the extension free of charge via the RapidMiner Marketplace to attract additional platform users and customers. Since this extension requires the underlying RapidMiner platform, there is an incentive to use the commercial RapidMiner platform and to become a paying customer. Hence, the functionality added by this extension is expected to attract new users for the underlying	Companies and organizations wanting to leverage injected data in their data analytics processes, e.g. for weather emergency use cases, maritime use cases, agricultural	Capability to integrate different data sources into data analytics processes Reconstructable Testing environment	Commercial exploitation: License fees for the underlying RapidMiner platform	Low–medium	The extension will be freely available on the Rapid-Miner Market-place but requires RM AI Studio or RM AI Hub or RM RTSA to be used.	Companies and organizations wanting to leverage data in their data analytics processes, e.g. for weath	Thanks to the easy-to-use graphical user interface (GUI) of RapidMiner AI Studio, this extension enables users to integrate data into their data analytics processes without coding via simple drag & drop of operators into

	RapidMiner platform and hence additional license revenue for this underlying platform.	use cases, etc.					er emerg ency use cases, mariti me use cases, agricul tural use cases, etc.	the visual workflow.
UPB – 10	UPB engineered a new Data Injector, which can push temporal and spatial editable data into an streaming service system.	and organiza-tions wanting to leverage injected data in their data analytics processes, e.g. for weather emergency use cases, maritime use cases, agricultural use cases, etc.	Capability to integrate different data sources into data analytics processes Reconstruc table Testing environmen t	Academic exploitation, Dissemination, Consultancy showcase	Low–medium	Not applicable.	Comp anies and organi za-tions wantin g to levera ge data in their data analyti cs proces ses, e.g. for weath er	User-friendly testing of complex realtime streaming services

							emergency use cases, maritime use cases, agricultural use cases, etc.	
UPB – 11	Scientific methodology for categorizing uncertainty in a model.	Academic institutions, innovation consultancies, strategy units	Categorized uncertainty	Academic exploitation, Consultancy services	Very low	Not applicable (scientific publication)	Researchers, innovation managers, strategy consultants	Categorized uncertainty to identify uncertainties

Table 54: Exploitation plan of UPB

Scientific research infrastructure	
Partner Name:	Paderborn University (UPB)
Project Role:	research and development partner
Target groups	academic, industry, IoT Developer,
Notes	-
Key Exploitable Results	

ID	Technology Readiness Level (1-9)	Gaps until market readiness	Resources & budget requirements	Technical Risks & barriers	Code/ Solution commented?	Storage location of all data of the solution	Contact person
UPB – 1	7	Hardening, documentation, long-term support model	1–2 scientific staff, minor infrastructure	Dependency on RapidMiner versions, scalability of workflows	Yes (research-prototype level)	Source Code publically available via the CREXDATA Source Code Repository (GitHub). Data	Deniz Özcan
UPB – 2	7	Tool support, industrial validation	Scientific staff time	Limited industrial adoption without tooling	Not applicable	Scientific publication repositories (e.g. Zenodo)	Marcel Ebel
UPB – 3	7	Empirical validation, practitioner guidelines	Scientific staff	Conceptual complexity for practitioners	Not applicable	Scientific publication repositories (e.g. Zenodo)	Deniz Özcan
UPB – 4	7	Extended validation, optimization	Scientific developer, computing resources	Simulation fidelity, hardware abstraction	Yes	Source Code publically available via the CREXDATA Source Code Repository (GitHub). Data	Niklas Döhner
UPB – 5	7	Extended validation, optimization	Scientific developer, computing resources	Simulation fidelity, hardware abstraction	Yes	Source Code publically available via the CREXDATA Source Code	Niklas Döhner

						Repository (GitHub). Data	
UPB – 6	7	Operationalization, data integration	Scientific staff, data infrastructure	Data availability, computational complexity	Yes	Source Code publically available via the CREXDATA Source Code Repository (GitHub). Data	Deniz Özcan
UPB – 7	7	Security hardening, UX refinement	Web developer, hosting	Integration stability	Yes	Source Code publically available via the CREXDATA Source Code Repository (GitHub). Data	Niklas Döhner
UPB – 8	7	Productization and modularization	Minimal after project end	System complexity and dependencies	Yes	Source Code publically available via the CREXDATA Source Code Repository (GitHub). Data	Marcel Ebel
UPB – 9	7	Productization and modularization	Scientific staff, data infrastructure	No technical barriers or risks expected	Yes	Source Code publically	Deniz Özcan

						available via the CREXDATA Source Code Repository (GitHub). Data	
UPB – 10	7	Productization and modularization	Scientific staff, data infrastructure	No technical barriers or risks expected	Yes	Source Code publically available via the CREXDATA Source Code Repository (GitHub). Data	Deniz Özcan
UPB – 11	7	Empirical validation, practitioner guidelines	Scientific staff	Conceptual complexity for practitioners	Not applicable	Scientific publication repositories (e.g. Zenodo)	Jens Pottebaum

6.3.15 Universitat Rovira i Virgili(URV)

Table 55: Exploitation plan of URV

Scientific research infrastructure									
Partner Name:	Universitat Rovira i Virgili (URV)								
Project Role:	research and development partner								
Target groups	-								
Notes	-								
Key Exploitable Results									
ID	Name of the Key Exploitable Result	Other involved partners	If yes, who?	Joint ownership	If yes, who?	Standalone Result	Integrated in Crexdata System	Intellectual Property Strategy	Type of Result (Algorithm/ Model/ Method/ Process/ Software/ Knowledge)
URV – 1	Scientific publications	yes	BSC	no		yes	X	Open source	
URV – 2	Pilot demonstrators	yes	BSC	no		yes	X	Open source	
URV – 3	Models involving human expertise	yes	BSC	no		yes	X	Open source	

Table 56: Exploitation plan of URV

Scientific research infrastructure								
Partner Name:	Universitat Rovira i Virgili (URV)							
Project Role:	research and development partner							
Target groups	-							
Notes	-							
Key Exploitable Results								
ID	Exploitation Plan	Potential customers	Benefit to customers	Consultancy service/ Academic exploitation/ Commercial exploitation	Estimated maintenance cost	Estimated yearly selling price	Target group	Competitive advantage of the solution
URV – 1	As a university, our contribution to the project is our research output in the form of published articles,			X				

	which we do both alone and in collaboration with the BSC							
URV – 2				X				
URV – 3				X				

Table 57: Exploitation plan of URV

Scientific research infrastructure							
Partner Name:	Universitat Rovira i Virgili (URV)						
Project Role:	research and development partner						
Target groups	-						
Notes	-						
Key Exploitable Results							
ID	Technology Readiness Level (1-9)	Gaps until market readiness	Resources & budget requirements	Technical Risks & barriers	Code/ Solution commented?	Storage location of all data of the solution	Contact person
URV – 1	-	-	-	-	-	-	Alex Arenas
URV – 2	-	-	-	-	-	-	Alex Arenas
URV – 3	-	-	-	-	-	-	Alex Arenas

6.3.16 Hydrometeorological Innovative Solutions (HYDS)

Table 58: Exploitation plan of HYDS

Scientific research infrastructure									
Partner Name:	HYDS - hydrometeorological innovative solutions (HYDS)								
Project Role:	development partner								
Target groups	other cities with same weather risks, emergency management sector,								
Notes	-								
Key Exploitable Results									
ID	Name of the Key Exploitable Result	Other involved partners	If yes, who?	Joint ownership	If yes, who?	Standalone Result	Integrated in Crexdata System	Intellectual Property Strategy	Type of Result (Algorithm/ Model/ Method/ Process/ Software/ Knowledge)
HYDS – 1	Integration in ARGOS platform of other CREXDATA components	No	X	No	X	No	X	Open Source	Software: X

Table 59: Exploitation plan of HYDS

Scientific research infrastructure								
Partner Name:	HYDS - hydrometeorological innovative solutions (HYDS)							
Project Role:	development partner							
Target groups	other cities with same weather risks, emergency management sector,							
Notes	-							
Key Exploitable Results								
ID	Exploitation Plan	Potential customers	Benefit to customers	Consultancy service/ Academic exploitation/ Commercial exploitation	Estimated maintenance cost	Estimated yearly selling price	Target group	Competitive advantage of the solution
HYDS – 1	ARGOS is a platform already in the market. This project outcome will allow to extend ARGOS with other	Emergency case stakeholders	Interface to algorithm results together	Commercial exploitation: X	N/A (it will be integrated in either Argos System or	N/A (it will be integrated in either	Emergency managers	Integration of algorithm results in an EWS

	CREXDATA components. Exploitation will be incorporated as part of the service, making CREXDATA results accessible to end-users through the ARGOS platform. At the end of the project, some CREXDATA components should be selected (according to its maturity, relevance and interest) and bilateral agreements with involved partners will be needed.		with a emergency management dedicated tool		CREXDATA System)	Argos System or CREXDATA System)		Oriented to emergency managers covering wide range of data sources

Table 60: Exploitation plan of HYDS

Scientific research infrastructure							
Partner Name:	HYDS - hydrometeorological innovative solutions (HYDS)						
Project Role:	development partner						
Target groups	other cities with same weather risks, emergency management sector,						
Notes	-						
Key Exploitable Results							
ID	Technology Readiness Level (1-9)	Gaps until market readiness	Resources & budget requirements	Technical Risks & barriers	Code/ Solution commented?	Storage location of all data of the solution	Contact person
HYDS – 1	6 to 8 (depending on the outcome)	Systematic testing	Robust and systematic implementation of CREXDATA algorithms, testing in operational environment	mmaturity of the algorithms to integrate		HYDS servers & CREXDATA System	Jordi Roca Sancho

6.4 Appendix 3 – Results of Workshop "Cohesion Activities"

6.4.1 Communities and Events

Table 61: Listed communities and events

community	event	partner	date	Technology / end-user
MCI	ACM CHI	CNR, IAIS	2025	technology
ViS	EuroVis IEEE Vis	IAIS++, CNR	May 2024 Oct 2024	End-user
KD / ML / AI	ECMLPKDD	CNR, IAIS + use case partners	Sept 2024	End-user
AI & Big data congress		BSC	Barcelona 9.-10. October	End-user
CCIA (catalan association of AI)			2.-4. October	End-user
	112rescue	FDDO, UPB, DRZ	June 2024	End-user
	INTERSCHUTZ	FDDO, UPB, DRZ	2026	End-user
EENA	EENA annual conference	FDDO		End-user
	Disaster Research Days	DCNA	October 2024, Vienna	End-user
DRS-CERIS	Annual event	DRZ	7. June 2024	End-user
AI	XAI World Conference		July 2024	technology
EU Science for Preparedness Conference	Annual event	UPB, DCNA	October 2025	Technology, End-user
AI4EU groups, BDVA	EBDVF events	UPB	October 2024, November 2025	technology
vfdb (German Fire Protection Association)	Annual conferences	UPB, FDDO, DRZ	May 2024, May2025	End-user
Global Initiative on Resilience to Natural Hazards through AI Solutions	Yearly workshops	UPB	December 2025	End-user

6.4.2 Workshop Topics

Listed workshop-topics:

- Capturing human knowledge for S-T reasoning
- Reasoning on spatial-temporal domains
- Transparent AI for spatio-temporal applications
- Text mining
- Virtual human twin
- Covid 19 disease map
- Multiscale modelling of biological systems
- Risk governance – risk management, risk communication, risk assessment
- Disaster response decision support
- End-user oriented research – chances, challenges, limits
- COLLARIS UAV technology exercise – end-user requirements (field trial)
- Big data analytics for emergency use cases
- Safe intelligence
- Deep sea
- Maritime informatics & robotics
- Listed EU-projects:
- HUMANE-AI-NET, partner: CNR
- SoBigData, partners: CNR, IAIS
- COLLARIS
- TREEADS
- Synergize
- ASSISTANCE
- RESCART
- EVENFLOW
- AI4EU

7 Acronyms and Abbreviations

ADR	AI, Data and Robotics
ADRA	AI, Data and Robotics Association
AI	Artificial Intelligence
AIOD	Artificial Intelligence On-Demand
AI4Europe	European AI On Demand Platform and Ecosystem
API	Application Programming Interface
BDVA	Big Data Value Association
BM	Business Model
BP	Business Plan
BSC	Barcelona Supercomputing Center
CERIS	Community for European Research and Innovation for Security
CNR	Consiglio Nazionale delle Ricerche
CorC	Core Competences
D	Deliverable
DoA	Description of Action (Annex 1 of the Grant Agreement)
DCNA	Disaster Competence Network Austria
DRZ	The German Rescue Robotics Centre
EBDVF	European Big Data Value Forum
EC	European Commission
EENA	European Emergency Number Association
ESAF	Emergency Services Academy of Finland
FDDO	Fire Department City of Dortmund
FEU	Federation of European Fire Officers
FMI	Finnish Meteorological Institute
FR	Fraunhofer
HNI	Heinz Nixdorf Institute
HPC	High Performance Computing
HYDS	Hydrometeorological innovative solutions
IoT	Internet of Things
IF	Innovation Field
KPI	Key Performance Indicator
M	Month
ML	Machine learning

MoIFi	Ministry of Interiour Finland
MoU	Memorandum of Understanding
MT	Marine Traffic
MTr	Mega Trend
NCSR	National Centre for Scientific Research
PPP	public private partnership
RM	Altair Rapid Miner
TUC	Technical University of Crete
UAV	Unmanned Aerial Vehicle
UoA	University of the Aegean
UPB	Paderborn University
URV	Universitat Rovira I Virgili
VPC	Value Proposition Canvas
WP	Work Package
XAI	Explainable AI