

EXPLOITATION PLAN

D08

IDEALVis Consortium

<http://idealvis.inspirecenter.org/>



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**ΙΔΡΥΜΑ
ΕΡΕΥΝΑΣ ΚΑΙ
ΚΑΙΝΟΤΟΜΙΑΣ**

Executive Summary

The goal of the IDEALVis project is to enable human-centered adaptive data visualizations that will facilitate more efficient and effective data exploration and analysis of complex and multivariate business datasets, in order to enable more effective decision making on business tasks. To this end, the research team has conducted research and innovation activities in several areas, such as investigation of individual differences in cognitive processing with respect to data visualizations, formulation of a dynamic multi-dimensional human-centered user model, process mining to anonymously analyze end-user interactions, and dynamic adaptation of the structure and semantics of data visualizations, based on users' individual characteristics to increase user satisfaction and comprehensibility. These activities had led to several scientific and technological outcomes that present further exploitation opportunities.

This deliverable focuses on the opportunities and mechanisms for exploiting the results and achievements developed under the IDEALVis project, both internally among project partners and with external organizations. The exploitation activities are considered interrelated and have common targets with the dissemination and communication activities presented in D04-Dissemination Plan. However, as IDEALVis gradually evolves as a research and innovation project and also finds applicability as a commercial service/components, the exploitation plan is more tailored with specific activities that seek further enhancement of the research team's capacity with international collaborations and engagement in relevant EU project and initiatives and identification of industries which can exploit IDEALVis services.

The results of the exploitation plan are already evident to this date. The consortium has been invited to participate as a core partner in several national and EU proposals, including Horizon Research and Innovation Actions (RIA), such as XTREMESIGHT (HORIZON-CL4-2022-DATA-01) and INFER (HORIZON-CL4-2021-HUMAN-01), Horizon Innovation Actions (IA), such as ORIGINS (HORIZON-CL4-2022-DATA-01) aiming to further enhance the research and innovation capacity of the project. Furthermore, a number of commercial exploitation opportunities have been identified that aim to utilize individual components of IDEALVis for improvement of existing software and services of the industry, with the most promising being persona-based user interfaces for compliance and regulatory tech processes (optimized data visualizations for compliance officers and managers), and process mining visualizations for identifying the bottlenecks in analytical pipelines.

The structure of this deliverable is as follows: Section 1 identifies the exploitable project outputs and categorizes them according to their type and technology readiness level. Section 2, lists the exploitation opportunities that the consortium aims, providing specific targets for further research and innovation and commercial exploitation. Finally, in Section 3 we provide the strategy for internal and external exploitation.

Table of Contents

EXECUTIVE SUMMARY	2
LIST OF FIGURES.....	4
LIST OF TABLES.....	5
1 EXPLOITABLE PROJECT OUTPUTS.....	6
2 EXPLOITATION TARGETS.....	7
2.1 Research Community	7
2.2 Funding streams.....	8
2.3 Industry Sector	9
3 EXPLOITATION STRATEGY.....	9
3.1 Exploitation Timeline.....	10
3.2 Internal Partner Exploitation and IPR Management	12

List of Figures

No table of figures entries found.

List of Tables

Table 1: Technology Readiness Levels (TRLs)	6
Table 2: Technology Readiness Levels (TRLs)	7
Table 3: Exploitation Matrix	10
Table 4: Exploitation Timeline	12

1 Exploitable Project Outputs

This section describes the scientific and technological results of the project. To indicate the maturity of the results, we employ the Technology Readiness Levels¹ (see Table 1) as these are defined by the European Commission for the horizon programmes, supplemented by descriptions provided by the US DoD².

Level	Definition	Description
TRL 1	Basic principles observed	Scientific research begins to be translated into applied research and development, basic properties.
TRL 2	Technology concept formulated	Practical applications are invented based on basic principles; speculative application, no detailed analysis.
TRL 3	Experimental proof of concept	Analytical or laboratory studies to validate analytical predictions, not yet integrated or representative.
TRL 4	Technology validated in a lab	Basic components are integrated to show how they work together, allows ad-hoc models.
TRL 5	Technology validated in a relevant environment	Components are integrated with reasonably realistic supporting elements, tests can commence.
TRL 6	Technology demonstrated in a relevant environment	Representative model or prototype system, tested in a relevant environment, restricted conditions
TRL 7	System prototype demonstration in an operational environment	Demonstration of an actual model or a system prototype in a realistic operational environment.
TRL 8	System complete and qualified	Technology/models proven to work in final form and under expected conditions, end of true development.
TRL 9	Actual system proven in an operational environment	Actual application of the models and technology in its final form and under realistic operational conditions.

Table 1: Technology Readiness Levels (TRLs)

We now present the project's exploitable outcomes and their corresponding TRL. Before, we proceed, we would like to mention that TRL 7 typically represents a major step up from TRL 6, requiring the demonstration of the actual system prototype in the operational environment. Although IDEALVis was tested in a realistic environment, that mimics a subset of the functionality of the operational environment under realistic conditions, it does not fully adhere to the requirements of TRL 7. However, it needs to be noted that the TRL of the current IDEALVis functional prototype, fulfils the following TRL 7 requirements:

- The prototype functionality is close to the functionality of the operational environment

¹ Technology Readiness Levels (TRLs), https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2021-2022/wp-13-general-annexes_horizon-2021-2022_en.pdf

² U.S. Department of Defense (DoD) Technology Readiness Assessments, <https://apps.dtic.mil/dtic/tr/fulltext/u2/a554900.pdf>

- The tested tasks were set by the industry partners, representing real problems and day to day operations.
- The process flow mimics similar analytical process flows used by the industry partners but in a relatively simplified/optimized manner (e.g., some data are already pre-processed)
- The prototype is fully operational system, albeit the limited functionality, similar to the operational systems used by the industry partners.
- The prototype was validated using performance, usability and functionality metrics.

Type	Output	TRL
Scientific	Study of impact of cognitive factors with data visualizations type and elements	5
Scientific	Design of multi-dimensional human-centred user models	5
Scientific	Method for generating human-centred adaptive data visualization conditions for enhanced UX and decision making	5
Scientific	Design of a user-centred adaptive data visualizations framework	5
Technology/ Platform	User-Modelling platform to capture the user characteristics. Open and flexible to include additional tests structured in the required platform format	5
Technology/ Component	Components to visualize the performance of users on user modelling tests individually and within groups	5
Technology/ Component	Open and flexible analytical workflow management, which supports different types of analytical tasks	6
Technology/ Component	Component that generates personalized visualizations	6
Technology/ Component	Open and flexible visualizations library can be integrated in any platform requiring visualizations	6
Technology/ Platform	Platform that generates adaptive visualizations	6

Table 2: Technology Readiness Levels (TRLs)

2 Exploitation Targets

2.1 Research Community

IDEALVis is an ambitious project which aims to make significant scientific contributions to important data analytics related research areas. The main topics of research the project aims to contribute are:

- **User modelling and Adaptation** – multi-dimensional user modelling, individual differences, psychological aspects of recommendation, user-adaptive data analytical environments
- **Intelligent User Interfaces** – Adaptive visualizations, personalized visualizations, comprehensibility, Adaptive information visualization, User-centric studies of interactions with intelligent user interfaces, Interfaces for personalized and non-personalized

recommendation systems, implementation, and evaluation of Interfaces for Human-centred artificial intelligence

2.2 Funding streams

To improve the capacity of the research team and increase the project's impact, IDEALVis aims to form and seek links and strategic alliances with relevant research groups and ongoing projects, and seek further funding at a national and international level. The project outcomes contribute to areas related to leading data and human-centred technologies. As such, the most relevant funding calls are HORIZON-CL4-DATA and HORIZON-CL4-HUMAN, which aim to develop and enable the uptake of the next-generation computing and data technologies, and support human-centred and ethical development of digital and industrial technologies.

To this end, the consortium identified the following calls that were directly relevant to the exploitable outcomes of the project:

- HORIZON-CL4-2022-DATA-01-01: Methods for exploiting data and knowledge for extremely precise outcomes. The call requires the development of interactive and intuitive visualizations that allow people (with different needs, interests and backgrounds) to understand complex phenomena by smart selection of parameters, anticipation of user needs/interest and by novel ways of combining visual and non-visual elements and/or augmented reality.
- HORIZON-CL4-2021-HUMAN-01: The calls aims to develop trustworthy AI technology, key for acceptance, to take full advantage of the huge benefits such technology can offer, and demonstrate the benefits in particular applications. Human-centred explanations, such as the case of human-centred visualizations can contribute in improving the explainability of systems.

Furthermore, the consortium has identified the following calls where individual elements of the project outputs can be exploited.

- HORIZON-CL4-2021-DATA-01-03: Technologies for data management, which considers improving the usability of the data.
- HORIZON-CL4-2022-DATA-01-04: Technologies and solutions for data trading, monetizing, exchange and interoperability, which considers allowing for data assets to be discoverable, in a user-friendly manner.
- HORIZON-CL4-2021-HUMAN-01-02: European coordination, awareness, standardisation & adoption of trustworthy European AI, Data and Robotics, which mentions the promotion of the adoption of trustworthy AI, data and robotics in procurement both public and private organizations.

- HORIZON-CL4-2022-HUMAN-02-01: AI for human empowerment which aims to build the next level of perception, visualisation, interaction and collaboration between humans and AI systems working together as partners to achieve common goals, sharing mutual understanding and learning of each other's abilities and respective roles.

The consortium will also actively pursue collaborations to participate in national research and innovation calls.

2.3 Industry Sector

The consortium will also exploit its national and international network to identify and reach out to key industry sectors for exploitation of the project outcomes. The industry partners of the project and key collaborators have an important role for this, offering advisory services for the national and international market, and enabling identification of industries and domains that can benefit for the project outcomes.

The key industry sectors that have been identified are listed below:

- **Retail and Consumer solutions**, providing customized human-centred visualizations and dashboards to analyse sales trends and customer habits, plan for customer demand and drive marketing strategies.
- **Regulatory Compliance solutions**, for monitoring and controlling processes for regulatory compliance and offering key user types, such as compliance officers and decision makers, the personalized output required to make effective decisions
- **Banking and Insurance solutions**, offering personalized customer experiences.
- **Telecoms solutions**, to effectively transform audience analytics to improved customer experience and provide personalized reporting to gain deeper insights of operational aspects, such as network performance and customer habits.

3 Exploitation Strategy

The goal of the exploitation strategy is to maximise the impact and return on investment of all exploitable outcomes of the project. To accomplish this, the consortium has formulated the exploitation matrix presented in Table 3.

Audience	User Role	Objective	Medium
Academia (All regions of world targeted, but specific interest in Europe)	<ul style="list-style-type: none"> • Organization Directors • Senior Academics/Researchers • Project Coordinators 	<ul style="list-style-type: none"> • Raise awareness of the project outcomes • Discussions for collaborations on specific research activities 	<ul style="list-style-type: none"> • Meetings • Presentations • Publications (refereed, poster, demos) • Website • Project Workshops

		<ul style="list-style-type: none"> • Promotion of interdisciplinary collaborations • Cluster actions with other research teams about related research topics 	<ul style="list-style-type: none"> • Academic Workshops • Brokerage events
Industry	<ul style="list-style-type: none"> • Managing Directors • Principals • Team leaders 	<ul style="list-style-type: none"> • Raise awareness of the project outcomes • Seek commercial exploitation of components, parts of the platform 	<ul style="list-style-type: none"> • Meetings • Presentations • Website • Project Workshop • Business oriented workshops • Press release • Social media
General Public	<ul style="list-style-type: none"> • Individuals 	<ul style="list-style-type: none"> • Raise awareness of the project outcomes • Stimulate interest in the interdisciplinary areas of the project 	<ul style="list-style-type: none"> • Website • Project Workshop • Social media

Table 3: Exploitation Matrix

3.1 Exploitation Timeline

The exploitation of the project's outcomes started as soon as the project produced its first tangible results, such as the user modelling platform. At the time, the team started raising awareness of the project's outcomes and explored synergies on the application of the platform for further research activities, including application of the platform to support other fields of research (e.g., seamless user modelling for different research areas) or to support industry needs (e.g., develop aptitude tests for more efficient HR recruitment processes).

An overview of the exploitation model timeline, for each exploitable outcome can be seen in the figure below.

Output	Main Target(s)	Exploitation timeline	Main Objective(s)
Study of impact of cognitive factors with data visualizations type and elements	Academia General Public	After Study 2	- Further research collaborations - Raise Project awareness
Design of multi-dimensional human-centred user models	Academia	After Study 2	- Further research collaborations - Joint proposals
Method for generating human-centred adaptive data visualization	Academia Industry General Public	After Study 3	- Further research collaborations - Joint proposals

conditions for enhanced UX and decision making			<ul style="list-style-type: none"> - Commercial Exploitation (Consultancy, outsourcing) - Raise Project awareness - Generate Network
Design of a user-centred adaptive data visualizations framework	Academia Industry	After finalization of Design	<ul style="list-style-type: none"> - Further research collaborations - Applicability in other application domains - Commercial Exploitation (Consultancy, outsourcing)
User-Modelling platform to capture the user characteristics. Open and flexible to include additional tests structured in the required platform format	Academia Industry	After finalization of user-modelling implementation	<ul style="list-style-type: none"> - Further research collaborations - Joint proposals - Commercial Exploitation in different application domains (e.g., HR) (Consultancy, outsourcing)
Components to visualize the performance of users on user modelling tests individually and within groups	Industry	After project ends	<ul style="list-style-type: none"> - Commercial Exploitation in different application domains (e.g., Compliance, Performance Monitoring, Process Mining) (Consultancy, outsourcing) - Joint proposals
Open and flexible analytical workflow management, which supports different types of analytical tasks	Academia Industry General Public	After project ends	<ul style="list-style-type: none"> - Further research collaborations (process mining) - Joint proposals - Commercial Exploitation in different application domains (e.g., Compliance, Performance Monitoring, Process Mining) (Consultancy, outsourcing) - Raise Project awareness
Component that generates personalized visualizations	Academia Industry	After project ends	<ul style="list-style-type: none"> - Further research collaborations (explainability, trustworthiness) - Joint proposals - Commercial Exploitation in different application domains (Consultancy, outsourcing)
Open and flexible visualizations library can be integrated in any platform requiring visualizations	Industry	After project ends	<ul style="list-style-type: none"> - Commercial Exploitation in different application domains (e.g., retail, audit) (Consultancy, outsourcing)
Platform that generates adaptive visualizations	Academia Industry General Public	After project ends	<ul style="list-style-type: none"> - Further research collaborations (multi-disciplinary collaborations) - Joint proposals

			<ul style="list-style-type: none"> - Commercial Exploitation in different application domains (Consultancy, outsourcing) - Raise Project awareness
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Table 4: Exploitation Timeline

3.2 Internal Partner Exploitation and IPR Management

The partners have agreed from the beginning of the project the basis for ownerships and access to Intellectual Property Rights (IPR). More specifically, the knowledge which was produced during the project is the property of the partner carrying out the work leading to that knowledge. If more than one partner has carried out the research work leading to the production of such knowledge (e.g., data analytics component), they have joint ownership on the knowledge produced and they will provide adequate and effective protection for knowledge that is capable of industrial or commercial application.

With regards to the concepts designed, the industry partners have the freedom to incorporate these designs to enhance the internal products and services. In the case, where these designs have the potential for third party commercial exploitation then notification must be given to the other partners, during which time they have the right to object. In the case all partners agree, then a meeting will be arranged to discuss the consulting services fees.

With regards to the software programming code produced, the corresponding partners producing the code have agreed that a perpetual license is provided for components that were designed with the input of the industrial partners, which includes the data analytics algorithms, data analytics workflow management and data visualizations engine.

Finally, the partners have agreed that transfer of ownership of knowledge of scientific and technological results is allowed, though the obligations regarding that knowledge must be passed on to the transferee. In principle, as long as the partner concerned is required to grant access rights, notification must be given to the other partners, during which time they have the right to object. Transfer of ownership will not be allowed when important knowledge would create a major competitive disadvantage for other companies, or when it would be inconsistent with ethical rules and principles recognized at a national and international level.