

D6.3: OPENVERSE Observatory (1st release)

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Authors	Francesco Mureddu (Lisbon Council), John Favaro (Trust IT)
Reviewers	All partners
Abstract	This is the first version of the OPENVERSE observatory which will contain all the projects achievements available to all. In the first version, available at https://openverse.trust-it.it/observatory , descriptions of companies and case studies can be found.
Keywords	Observatory, case study, company, flexibility

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* R: Document, report (excluding the periodic and final reports)

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EXECUTIVE SUMMARY

The OpenVerse **Project Observatory** has a cross-cutting nature, by virtue of its mission as the repository to capture and make available the outcomes of the OpenVerse project. It is collocated in Work Package 6 (specifically, Task 6.3). Nevertheless, it is relevant to all tasks in the project delivering concrete outcomes intended for broad distribution to the public.

The overall conceptual approach to the design and operation of the Observatory is modelled on the Co-VAL repository and the OECD Observatory of Public Sector Innovation. These two models of observatory implementations provide a set of **categories** of entities to be stored within their repositories, whose structure is determined by a set of characteristics on which it is desired for them to be **searchable** and retrievable.

Two categories are implemented in this first release: (a) information about companies and their products, tools, and services, which are outputs from Task T2.2, Marketplace of Opportunities; and (b) information about case studies generated within the context of T2.1 on the OpenVerse watch. The Observatory is implemented in a separate and distinct technical environment from the website, using facilities that are intended to support flexibility and scalability in data modelling and search.

The design and structure of the Observatory may be roughly divided into two parts: the design of the “front end”, and of the “back end”. In the front end, the Observatory is conformant to the theming of the main Portal. It is also designed to be responsive, permitting reasonable display for all types of devices, from tablets to large monitors.

The onerous requirements on flexibility affected the design of the back-end of the Observatory. The facilities of the underlying Content Management System were exploited to ensure the necessary flexibility in two particular areas: field definitions and controlled vocabularies.

The next phase of the Observatory will involve the definition and implementation of new categories representing the next stream of outcomes expected to be produced in the project.

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ABBREVIATIONS

AWS	Amazon Web Services
CMS	Content Management System
LC	Lisbon Council
TL	Task Leader
WP	Work Package



1 INTRODUCTION

The OpenVerse project is structured into a set of seven work packages, as illustrated in Table 1. The tasks within these work packages may be loosely divided into two groups: analytic and engagement tasks, which deal with the generation of insights, recommendations, and community building and outreach; and tool-related tasks, which deal with the creation of tools whose purpose is to assist the more analytic tasks and to capture their results.

The tasks oriented toward tool creation are spread throughout the work packages, according to their affinity with the related analytical tasks. For example, the project radar, a visualisation tool intended to assist in domain-oriented analyses, is collocated in the same work package (WP2) as many of the foresight activities.

The **Project Observatory** has a more cross-cutting nature, by virtue of its mission as the repository to capture and make available the outcomes of the project. It is collocated in Work Package 6 (specifically, Task 6.3), along with tasks such as exploitation related and standards-related activities. Nevertheless, it is relevant to all tasks in the project delivering concrete outcomes intended for broad distribution to the public.

Table 1: OPENVERSE Work Packages

Work Packages					
WP number	WP name	Lead Partner	Start	End	Deliverable No.
WP1	Co-creation of open-source tools for the Metaverse	PO	M1	M36	D1.1, D1.2
WP2	Strategic Guidance for an Open and Human Centric Metaverse	Trust-IT	M1	M36	D2.1, D2.2, D2.3, D2.4, D2.5
WP3	Barriers and Policy gaps for governance and business models through experiments	INS	M1	M24	D3.1, D3.2, D3.3, D3.4
WP4	Communication and Dissemination	Martel	M1	M36	D4.1, D4.2, D4.3
WP5	Collaboration and Synergies	BDVA	M1	M36	D5.1, D5.2, D5.3,

					D5.4, D5.5, D5.6, D5.7
WP6	Impact creation	IDC	M1	M36	D6.1, D6.2, D6.3, D6.4, D6.5, D6.6
WP7	Project Coordination and management	LC	M1	M36	D7.1, D7.2, D7.3, D7.4, D7.5, D7.6, D7.7, D7.8

The implemented Project Observatory in its first version was delivered to the Consortium on 31 July 2024. This document is intended to accompany the Observatory delivery with expository information.

1.1 STRUCTURE OF THE DELIVERABLE

The deliverable is structured in the following way:

- **Introduction.** This section describes the overall context within the OpenVerse project in which this task resides and which has produced the primary requirements.
- **Specifications of the Observatory.** This section describes the requirements on the Observatory that lead to the specifications that drove its implementation, both in terms of user experience and in terms of underlying technical prerequisites.
- **Design and structure of the Observatory.** This section describes the decisions taken to convert the requirements / specifications emerging from the previous section into design decisions and subsequent implementation of the Observatory on the chosen platform and with the chosen toolset. Examples are given.
- **Conclusion and next steps.** In this section, the next phase of implementation and expansion of the Observatory is briefly described.

2 SPECIFICATIONS OF THE OBSERVATORY

In the original proposal and subsequent Grant Agreement the overall conceptual approach to the design and operation of the Observatory was described on the model of two existing implementations of observatories: the Co-VAL repository (www.co-val.eu/case-studies) and the OECD Observatory of Public Sector Innovation (oecd-opsi.org).

These two models of observatory implementations provide a set of **categories** of entities to be stored within their repositories, whose structure is determined by a set of characteristics on which it is desired for them to be **searchable** and retrievable. This overall conceptual approach drove the specifications of the OpenVerse Observatory, as described in the following sections.

2.1 CONTENT-RELATED SPECIFICATIONS OF THE OBSERVATORY

As noted above, the first implementation element of the Observatory is the categories of entities to be stored therein. As stated in the Grant Agreement, the objective of the Observatory is to eventually make available all the project outcomes when they become available. To this end, a first analysis of the potential categories of entities was carried out by task leaders Trust-IT and Lisbon Council, who are co-responsible for the population, maintenance, and curation of the Observatory (Table 2).

Table 2: First analysis of expected Observatory contents

Item	Type	Remarks
LC Dialogues	Documents	The Dialogues are not intended to go into the Observatory. Rather, they will be used to inform Deliverables, Reports, and so forth.
Marketplace of Opportunities	Structured documentation	Information primarily about companies, tools and services. First version of field and tag structure is running in the Observatory. Extensions expected as new domains are added.

Case Studies	Structured Documentation	Currently focusing on market-oriented case studies. First version of the field and tag structure has been implemented in the Observatory. Is expected to be extended to broader case studies, e.g. government, public administration, etc.
Existing Virtual Worlds	Structured Documentation	Outputs of T1.1. An Excel file has been created in T1.1 with structured dimensions that is expected to be a model for the structure in the Observatory. Possible basis for Radar input (TBD in later version).
OpenVerse Roadmap	Interactive display	LC has provided an example of this type of implementation as an interactive display. The roadmap is due later in the project.
Policy Recommendations	Documents	Outputs of T2.5. The Policy Recommendations will effectively consist of the Roadmap and the Policy Briefs to be produced, with both stored in the Observatory.
Deliverables	Documents	Currently the project website foresees a Library menu item with Deliverables in a submenu, as well as Scientific Publications . It is foreseen to store the deliverables there.
Mixed reality repository of use cases	Structured Documentation	Output of T1.4 (M24-M36). Will be structured as a repository in the Observatory, with appropriate filters applied.
Technology watch	Structured documentation	Output of T2.1 (M1-M36) as inputs are generated.
Taxonomy	Interactive display	Output of T2.1 (M1-M36). Currently envisioned as a possible mind map. Can also be implemented as a top-level filter over the Observatory and utilised in the Radar (TBD in later phase).

As of the date of delivery of the Observatory (M9, 31 July 2024), the generation of project outputs in the greater part of entity categories was scheduled for later dates in the project timeline. It was possible, however, to select two categories and generate associated outcomes already at a relatively early date in the timeline as the incoming data for the first implementation of the Observatory. These categories were (a) information about companies and their products, tools, and services, which are outputs from Task T2.2, Marketplace of

Opportunities; and (b) information about case studies, which is a cross-cutting category across several tasks, but for this purpose were generated within the context of T2.1 on the technology watch. Using these two categories it was possible to derive requirements on the Observatory for the implementation of distinct entity categories and to derive first specifications of the searchable characteristics of the entities to feed into filtering and taxonomic mechanisms.

2.2 IMPLEMENTATION-RELATED SPECIFICATIONS OF THE OBSERVATORY

The primary technical requirements deriving from the content-related specifications of the Observatory (Section 2.1) were the need for flexibility in the specification of content entities; scalability both in the number of potential categories and the amount of data stored in the Observatory; and extensibility in the searching mechanisms as work on tasks such as the OpenVerse Taxonomy proceeds over the duration of the project.

These technical requirements are quite different from the requirements on the other major platform in the project, the **OpenVerse website**. The website fulfils requirements more related to traditional outreach and communications activities, and is not expected to have to conform to the more demanding data-related requirements of the Observatory.

As a result, it was decided to implement the Observatory in a separate and distinct technical environment using facilities that are intended to support flexibility and scalability in data modelling and search. Whereas the website is implemented in the popular WordPress environment, the Observatory has been implemented in the Drupal Content Management System (CMS) environment on a separate Amazon Web Services (AWS) platform. Drupal is an open-source framework that is particularly well-known for its flexible and extensible data definition, management, and search facilities.

Since it was specified in the Grant Agreement that the Observatory must be made available through the project portal, however, it was agreed between the two responsible partners for the website / portal (Martel) and the Observatory (Trust-IT) to associate the Observatory with

a subdomain of the website and provide transparent linkage from the website to the Observatory for the user. In this way, it may be ensured that the OpenVerse portal user sees a unified set of underlying services and facilities.

3 DESIGN AND STRUCTURE OF THE OBSERVATORY

The design and structure of the Observatory may be roughly divided into two parts: the design of the “front end”, and of the “back end”.

3.1 FRONT-END: PRESENTATION AND USER EXPERIENCE

As explained in Section 2.2, one requirement was to present a unified working environment to the user to the greatest degree possible, so despite the two technically distinct implementation environments (WordPress and Drupal) it was required to conform to a set of theming principles as far as possible in the presentation of the Observatory. An example of this is in the front page of the Observatory (shown in Figure 1), where the theming and the background, texts, and buttons are conformant to the overall OpenVerse theme.

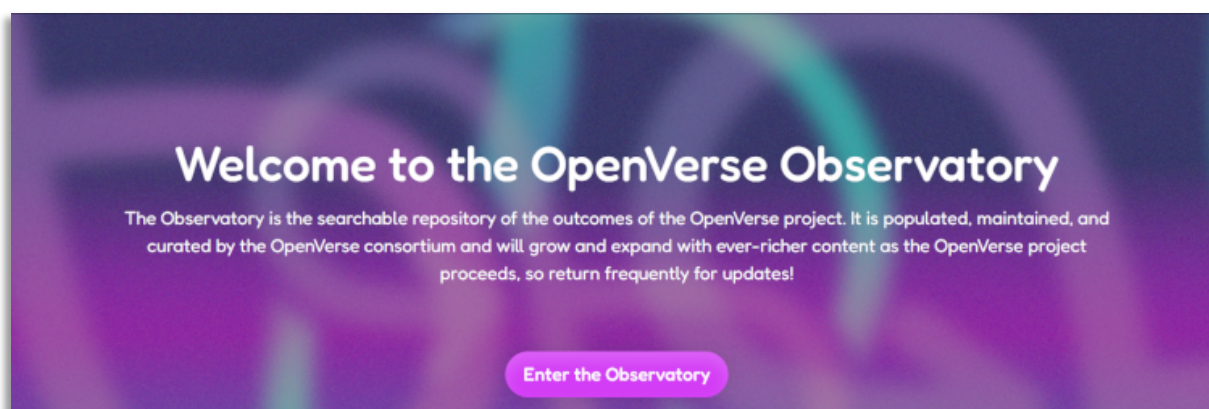


Figure 1: Front page of the Project Observatory

Beyond the front page of the Observatory, the overall design was conceived to respect the requirement described in Section 2 to be modelled after the two existing implementations of the Co-Val Observatory and the OECD Observatory of Public Sector Innovation. Those two implementations follow a general approach of presenting summary versions of content entities within their respective categories. These “summary versions” include a graphical icon whose purpose is to make the entity as immediately recognizable as possible, together with a

summary text intended to give the reader a quick impression of what the more detailed contents present.

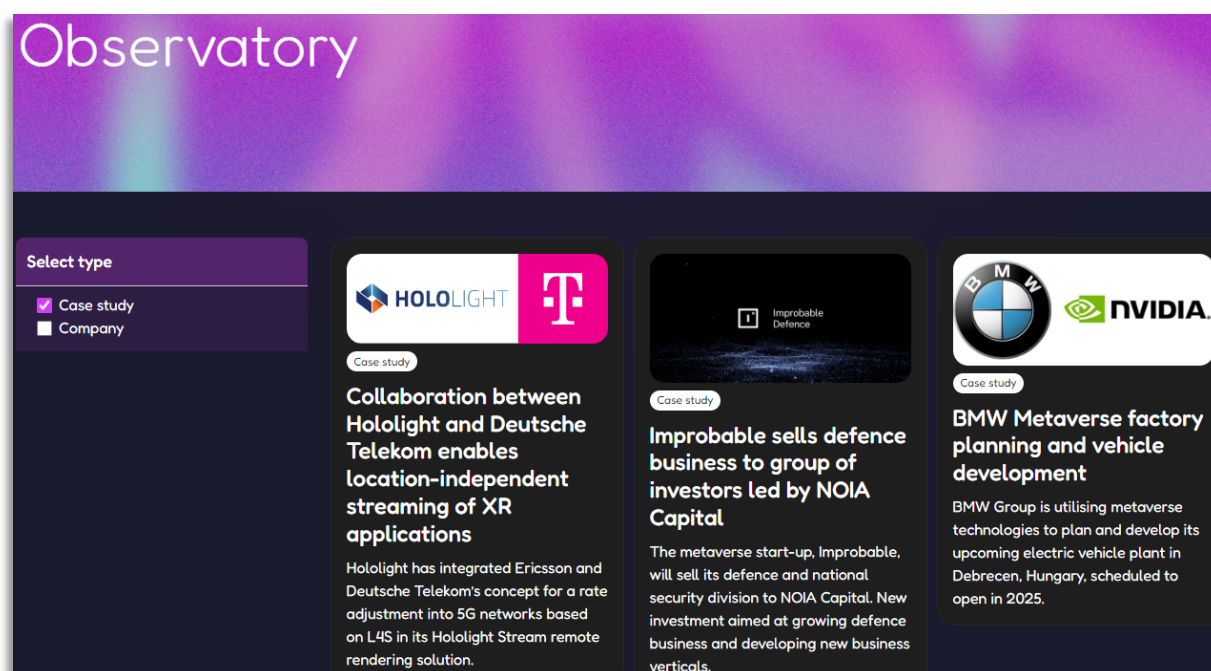


Figure 2: Observatory summary page

On the left side of the overall summary page is the filtering mechanism, which allows the user to select content entities according to different criteria (this design is modelled after the designs of the model implementations). One criterion was to be able to filter to access individual categories, as seen above. Another criterion is expected to be able to filter to access entities that are cross-cutting across distinct categories. Thus, it is expected that the filtering mechanisms will be modified and expanded considerably over the timeline of the project.

Another derived requirement related to presentation of the entities and categories present in the Observatory was that it be **responsive** according to modern principles of web design. Modern users of web platforms, even repositories such as the OpenVerse Observatory, access the platforms from numerous different types of devices ranging from large monitors to notebooks to tablets, and even cell phones. Thus, it was a requirement to be able to

accommodate these types of access. Figure 3 illustrates the summary page as it would be presented in a tablet or a cell phone.

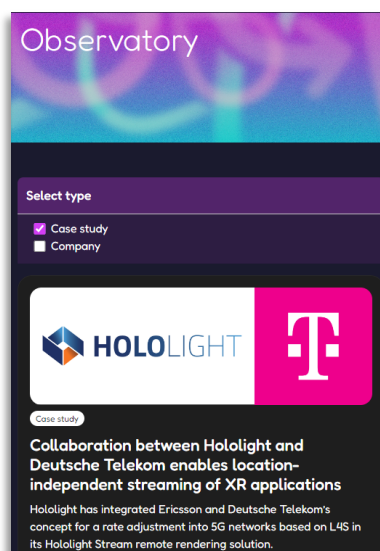


Figure 3: Tablet responsive presentation

Note that the filtering facility has been placed above the content entities, and the entities have been linearised in a single column.

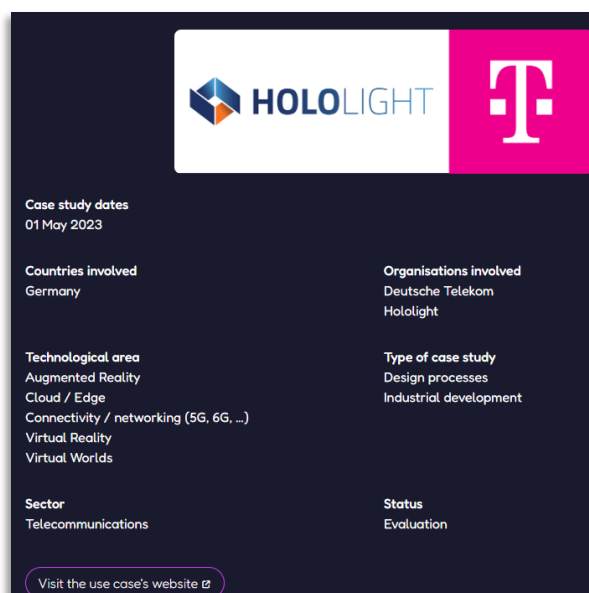


Figure 4: Individual entity presentation (case study)

Entering into detailed presentation, Figure 4 illustrates the presentation of an individual content entity (here a case study). Here it is possible to see the field structure of the entity, which form the basis for the searchability of the contents of the Observatory. In this first version of the Observatory, a relatively neutral theming was provided for the content entities. It is expected that the theming will be modified over the course of the project as user experience is gained and improvements are suggested from the user community.

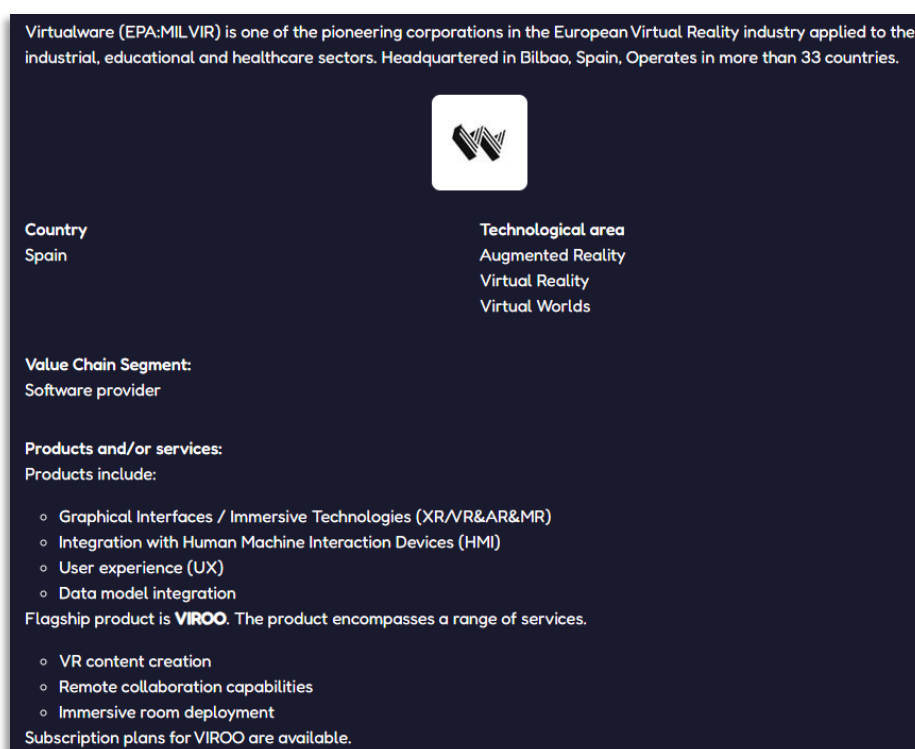


Figure 5: Individual entity presentation (company)

Figure 5 shows the detailed presentation of a different type of content entity (company) and illustrates the presentation of a different set of characteristics (fields). Likewise, this illustrates that future modifications in detailed presentation are likely to take place with respect to individual categories rather than in a global fashion.

Overall, this discussion leads to the highlighting of an important issue in the design of the Observatory: the content types are extremely heterogeneous, and it is expected that the

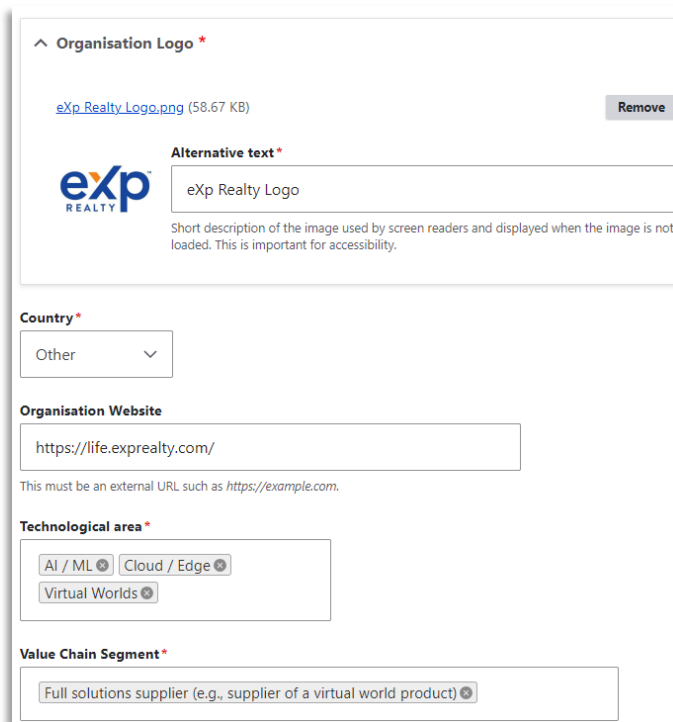
design will need to evolve significantly over the timeline of the project. The steps taken in the back end of the Observatory design to address this issue are described in the next section.

3.2 BACK-END: CONTENT ENTRY AND FILTERING FACILITIES

The onerous requirements on flexibility affected the design of the back-end of the Observatory. The facilities of the underlying Content Management System were exploited to ensure the necessary flexibility in two particular areas: field definitions and controlled vocabularies.

3.2.1 Management of content entity fields

The content entry mechanisms are designed to be sufficiently flexible that they can be changed at a level above the technical level when new content leads to the conclusion that new entry fields must be added, or existing fields must be changed or redefined.



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Alternative text *

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Short description of the image used by screen readers and displayed when the image is not loaded. This is important for accessibility.

Country *

Other ▾

Organisation Website

This must be an external URL such as <https://example.com>.

Technological area *

AI / ML  Cloud / Edge  Virtual Worlds 

Value Chain Segment *

Figure 6: Example of content entry for Company entity type

Figure 6 shows the entry form for a content entity of type Company. During the implementation of this first version of the Observatory, a process of continuous refinement of the content type definition was needed as new content exemplars were included into the collection of entries. While the original definition was handled by the technical team, it is imperative that it be possible for personnel operating at a level above the technical team to be able to modify the structure of the content entities to add, modify, and delete structural fields in the entities as the need arises.

The underlying CMS provides an extremely fine-grained set of permissions and the capability of creating an arbitrary number of roles with which permissions may be associated. Together, they make it possible to have controlled management of content type structures at the content editor level.

+ Create a new field + Re-use an existing field		
Label	Machine name	Field type
Body	body	Text (formatted, long, with summary)
Country	field_eu_country	List (text)
Organisation Logo	field_image	Image
Organisation Website	field_url	Link
Other technological area	field_other_technological_area	Text (plain)

Figure 7: Content editor level editing of content structure

Figure 7 shows the facility for content structure editing in an excerpt for the Company entity. Appropriate permissions can be assigned to a privileged content editor to manage the structure through this facility without having to involve technical personnel – an essential capability for efficiency and flexibility as the Observatory evolves.

3.2.2 Management of controlled vocabularies

A **controlled vocabulary** plays an important role both in assisting content editors in respecting the boundaries of the domain context, and in content search and filtering, e.g. through

taxonomies. At the same time, the addition of new and very heterogeneous categories of content is expected to require constant modification and extension of the controlled vocabularies.

To support this flexibility, the vocabulary management facilities of the underlying CMS have been exploited to create and manage separate controlled vocabularies for the individual fields in content entry forms. Like the field definition capabilities described in Section 3.2.1, this activity can be managed at content-editor level – that is, not requiring intervention by technical personnel – and therefore are under the direct control of the content editors for modifications.

A strategy of defining a separate controlled vocabulary for nearly every field type of each content type was adopted, in order to ensure maximum independence of the vocabularies from each other and maximum flexibility in expanding the vocabularies.

The picture illustrates an example of case study sectors of application. The controlled vocabulary terms may be extended, rearranged in the display, and also placed within a hierarchy (as in the case of a taxonomy), under content-editor control. This is expected to be a continuous activity over the duration of the project as new data arrives.

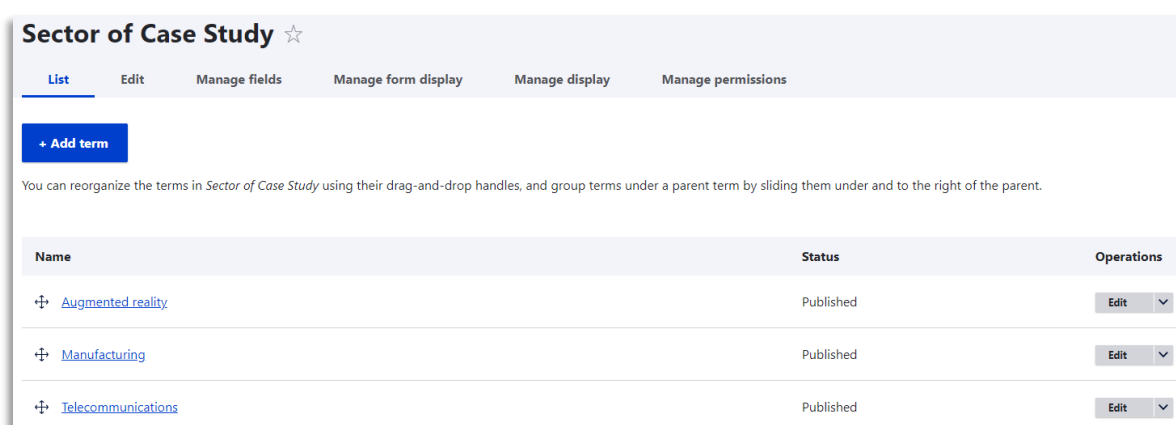


Figure 8: Facility for management of controlled vocabularies

Figure 8 shows an excerpt from the editing of the controlled vocabulary **Sector of Case Study** through the provided facility. Note that vocabulary entries can not only be edited, but also arranged in hierarchical groupings, which is expected to be of interest to the definition and implementation of more sophisticated filtering mechanisms (including the Taxonomy) as the project progresses.

3.3 CONTENT EDITOR ROLES

As explained earlier, the technical team introduced the first entity structure and content. However, for expediency and efficiency it can be desirable to enable external actors to the technical team to enter content independently. This requires a set of facilities to be provided to authorize and authenticate users, as well as the explicit definition of a role (“Content Editor”) with a well-defined set of associated permissions.

Name
⚡ Administrator
⚡ Administrative Content Editor
⚡ Content editor
⚡ Authenticated user
⚡ Anonymous user

Figure 9: Role definition facility

Figure 9 shows the facility for the definition of roles within the system. The **Content Editor** role has the needed permissions to introduce, edit, and delete content in the Observatory without technical intervention. The **Administrative Content Editor** role has additional permissions to edit the structure of content types. It is expected that that the role of Administrative Content Editor will be assigned primarily to curators of the Observatory – that is, partners Trust-IT and LC. While it is expected that most (if not all) normal content editors

will be provided by partners in the OpenVerse Consortium, there is no technical obstacle to the registration of content editors from any organization, including those external to the consortium. Although such a scenario is likely to be rare, it is not unthinkable. For example, companies might be granted content editor permissions to edit and augment their own Company information in the Observatory as part of the Marketplace of Opportunities. As a general rule, however, we expect content arriving from external entities to be curated by consortium partners before being added to the Observatory.

4 CONCLUSION AND NEXT STEPS

The OpenVerse Observatory is now implemented in its first release and is capable of accepting new entries in the initial two categories in which preliminary outcomes have been produced within the project.

The next phase will involve the definition and implementation of new categories representing the next stream of outcomes expected to be produced in the project. As of the date of writing of this document, it is expected that the Virtual Worlds content produced in T1.1 will be among the first new content categories, once the creators indicate that the results are in stable condition.

We also expect to be designing appropriate entry and display mechanisms for representing the results of the various types of OpenVerse workshops as they are executed.

The final release of the Observatory will take place in Month 36, accompanied by D6.4, and is expected to contain the full set of categories and corresponding content representing the outcomes of the project.