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[1.0]

## O1A2: Typology matrix

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<b>Abstract:</b>	<b>The document corresponds to activity 2 of Output 1 (Field analysis: Positioning HEIs in open and citizen science for open knowledge and innovation). This activity presents the typology matrix according to which the 20 selected open and citizen science cases (cf. O1A1) are analysed. The document presents the initial and updated typology matrix based on exchanges between INOS members.</b>
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## Consortium

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1.	Aalborg University	AAU	Denmark
2.	Tallinn University	TU	Estonia
3.	Web2Learn	W2L	Greece
4.	University of Oulu	UO	Finland
5.	University of Bordeaux	UBx	France
6.	STICHTING LIBER	LIBER	The Netherlands

## Revision History

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**Statement of originality:**

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## List of Abbreviations

The following table presents the acronyms used in the deliverable in alphabetical order.

<i>Abbreviation</i>	<i>Description</i>
CS	Citizen science
OS	Open science

## Executive Summary

The typology matrix is the tool that INOS team uses to analyse the 20 selected open and citizen science cases that were identified at activity O1A1. The initial typology matrix foreseen in the project proposal has been enriched by 2 new dimensions, the Open Innovation dimension and the FAIR dimension. The reasons for these adjustments are explained below.

## 1 Introduction

### 1.1 Scope

The typology matrix is a tool allowing the comparison of different open and citizen science cases based on common list of typological items. A preliminary version of the matrix is foreseen in the project proposal, which was subject to discussions and a revision among team members. More importantly, the O1 study which will be grounded on this matrix will connect the components of the typology to show how they impact each other, allowing HEIs to gain a multi-perspective viewpoint. The matrix will be an openly accessible result of the project.

### 1.2 Audience

Any interested reader

### 1.3 Structure

The structure of the document is as follows. Section 2 presents the initial typology as foreseen in the project proposal, and section 3 discusses improvements suggested by partners, in view to a final version of the typology matrix adopted for the O1 analysis.

## 2 Progress in review of the typology

According to the project proposal (p.107), the items of the typology are:

- Types of OS public activities;
- Modalities (activity at a physical location, online, blended (cf. Meetups), and also Internet and social networking capacities to support it);
- HEI roles in OS activities, e.g. from the least active to the most active;
- Human resources and profiles (necessary and desirable skills, competences, types of profiles)
- Type of HEI investment on OS activities (technical, material, human resources, and their combinations)
- Quality and impact of the achieved activity
- Ethical and legal considerations, data management
- Sustainability considerations (funding, community uptake, business openings)

Based on a first email exchange about the typology between the output author (Katerina Zourou), the peer reviewer (Antoine Blanchard) and the project coordinator (Evangelia Triantafyllou) on September 13, Antoine Blanchard suggested to replace “Modalities” by “Format” and duration as one component of Format (24h, 48h, one week, one semester etc.).

This resulted to version 2 of the typology, with the revised item highlighted in blue:

- Types of OS/CS public activity
- **Format**(activity at a physical location, online, blended (cf. Meetups), and also the Internet and social networking capacities to support it, **duration (24h, 48h, one week, one semester etc.)**);
- HEI roles in OS activities, e.g. from the least active to the most active;
- Human resources and profiles (necessary and desirable skills, competences, types of profiles)
- Type of HEI investment on OS activities (technical, material, human resources, and their combinations)
- Quality and impact of the achieved activity
- Ethical and legal considerations, data management
- Sustainability considerations (funding, community uptake, business openings)

During the collection of cases of open and citizen science by partners (O1A1 activity), it turned out that the Open Innovation dimension was not particularly addressed, therefore the author suggested to add a new item, “Open Innovation dimension”. The reasoning was the following (email exchange of 28.10):

*The typology doesn't contain an Open Innovation component whereas this is one of the dimensions dealt with in the O1 study. We need to include this component; shall we call the new item of the typology “degree of open innovation? Or “open innovation potential”?*

On 31.10 the three members (author, reviewer, coordinator) decided to call it “open innovation dimension” and to include it as separate item of the typology, which then appeared in the following form (new element in blue):

- Types of OS/CS public activity
- **Format** (activity at a physical location, online, blended (cf. Meetups), and also the Internet and social networking capacities to support it, **duration (24h, 48h, one week, one semester etc.)**);
- HEI roles in OS activities, e.g. from the least active to the most active;
- Human resources and profiles (necessary and desirable skills, competences, types of profiles)
- Type of HEI investment on OS activities (technical, material, human resources, and their combinations)
- Quality and impact of the achieved activity
- Ethical and legal considerations, data management
- Sustainability considerations (funding, community uptake, business openings)
- **Open innovation dimension**

At a monthly online group meeting on November 4, Kai Pata (TU) suggested that the open knowledge/open data dimension -also in relation to Output 3- was not particularly addressed in the typology matrix. Based on this comment, the author suggested to make the open knowledge dimension more specific, based on the following argument:

I am in favor of adding a new element, in connection to open data (because open knowledge is too broad to become a typology item). Regarding the open data dimension of our cases, instead of just having “open data” as item in the typology, it would be wiser to look at what possibilities for open data exist- thus to adopt the **FAIR** categorization which will allow us to go a step beyond the mere yes/no open data existence, to how they can be used, by whom, etc. Therefore, my suggestion, based on Kai’s comment (open data/open knowledge dimension) with which I fully agree, is to add a “FAIR dimension” item in the typology. This will be more time consuming (to deal with the nuances of data uptake in each of the 20 cases), but it will connect citizen science initiatives to the overall open science and data re-use perspective.

The suggestion to use the 4 FAIR principles (Findable, Accessible, Interoperable and Re-usable, cf. Wilkinson et al., 2016) to analyze the qualities of open data of each of the 20 selected cases was agreed by Eva Triantafyllou and Nicola Morelli from AAU, Kai Pata from TU and Antoine Blanchard from UBx. This led to the addition of the last item, “FAIR principles of data resulting from the activity”, in version 3 of the typology as shown below. In addition, the wording of item 4 (human resources and profiles) may be better formulated as “HEI staff investment and their profile”.

- Types of OS/CS public activity
- **Format** (activity at a physical location, online, blended (cf. Meetups), and also the Internet and social networking capacities to support it, **duration (24h, 48h, one week, one semester etc.)**);
- HEI roles in OS activities, e.g. from the least active to the most active;
- Human resources and profiles (necessary and desirable skills, competences, types of profiles) (or: HEI staff investment and their profile)
- Type of HEI investment on OS activities (technical, material, human resources, and their combinations)
- Quality and impact of the achieved activity

- Ethical and legal considerations, data management
- Sustainability considerations (funding, community uptake, business openings)
- Open innovation dimension
- FAIR principles of data resulting from the activity

The last step regarding the finalization of the typology consisted of a reconsideration of the FAIR principles. Despite the fact that the INOS team agreed to include the item “FAIR principles of data resulting from the activity”, the analysis of each of the 20 cases through the lens of the FAIR principles was inconclusive, especially due to the complex character of the issue (see table 1). INOS could not cater a FAIR expert to deal specifically with this issue, and it is generally well known that expertise on FAIR is very specific and goes beyond the scope of open and citizen science that INOS deals with.

Therefore, INOS team decided to eliminate the item “FAIR principles of data resulting from the activity” from the typology.

Finally, the open innovation dimension will not be dealt with in all 20 cases as it is not a common feature to all. Open Innovation will be discussed only with regards to the cases that do encompass this dimension, and a separate section in the O1 study will be dedicated to open innovation.

### 3 Conclusion

The typology matrix has been fruitfully discussed among partners and the final version of it is presented below. The matrix will now be applied to the selection of the 20 cases of O1A1.

Final version of O1A2:

- Types of OS/CS public activity
- Format (activity at a physical location, online, blended (cf. Meetups), and also the Internet and social networking capacities to support it, duration (24h, 48h, one week, one semester etc.);
- HEI roles in OS activities, e.g. from the least active to the most active;
- HEI staff investment and their profile (necessary and desirable skills, competences, types of profiles)
- Type of HEI investment on OS activities (technical, material, human resources, and their combinations)
- Quality and impact of the achieved activity
- Ethical and legal considerations, data management
- Sustainability considerations (funding, community uptake, business openings)



## References

Wilkinson, M. D., Dumontier, M., Aalbersberg, Ij. J., Appleton, G., Axton, M., Baak, A., ... Mons, B. (2016). The FAIR Guiding Principles for scientific data management and stewardship. *Scientific Data*, 3, 160018. Accessible at <https://www.nature.com/articles/sdata201618>