A FRAMEWORK FOR COOPERATIVES' TRANSPARENCY - A LINKED OPEN DATA APPROACH

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La Economía Social: herramienta para el fomento del desarrollo sostenible y la reducción de las desigualdades

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ABSTRACT

Transparency in the social economy sector and particularly in Cooperatives, is a fundamental element for stakeholders to increase their trust in these institutions. Cooperatives have their ideology of a participatory and democratic nature and a relevant function in society. Also, transparency promotes successful performance. The social object of a Cooperative aims to satisfy the needs of its members and aims to meet the interests of the community where the Cooperative develops its activity. It is this social function that justifies the positive discrimination of Cooperatives by the State. This positive discrimination demands for transparency in the functioning of Cooperatives.

Transparency is a legal demand, but there is no way to measure the level of transparency of a Cooperative to the best of our knowledge.

This paper describes a project which aims to define a Transparency Index for Cooperatives. By index, we mean a mathematical relationship combining several dimensions, indicators, or measures to form a single number. The project will also develop a technological framework based in the paradigm of linked open data, that will provide views of the data published by the cooperatives and will allow free access to structured data that can be re-used by third parties.

This index may, in the future, be adapted to be applied to other Social Economy entities as well as to for-profit organisations that integrate a concern for the economic, social, and environmental dimensions of sustainable development.

Keywords: Social Economy; Cooperatives; Transparency; Transparency Index; Sustainability; Interoperability; Linked Open Data; Semantic Web

1. INTRODUCTION

In the current context of COVID-19 with economic and social instability, Cooperatives (COOP) will be called upon to respond to the population's needs more than ever before. The COOP's DNA is based on its rationality, principles, structural features, and normative and ethical references consistent with the value of solidarity. COOP fulfil a social function, evidenced by the primacy of the individual and social objectives over capital; by democratic governance by the members; by the conjugation of interests of the members and with the general interest; by the defence and application of values of solidarity and responsibility; by the reinvestment of surplus funds in the long-term development objectives or in the provision of services of interest to the members or of services of general interest. The social object of the cooperative aims, not only the satisfaction of its members' needs, but must also meet the community's interests where the COOP develops its activity. It is this social function that justifies the positive discrimination of COOP by the State.

This positive discrimination demands transparency in the functioning of COOP. Transparency involves collecting information and making it accessible to the members, to the Government and to the public in general. The COOP's functioning must be based on trust and in strengthening governance, and must contribute to the sustainable growth of the COOP (Ruben & Lerman, 2005). COOP need members to trust the management team and the workers (Hu et al., 2017). Neither in law nor in literature we find a way to measure transparency in COOP that reflects their specificities.

This paper presents a project which aims to define a transparency index (TI) i.e., a mathematical relationship that combines several dimensions, indicators or measures to form a single number. This TI will measure the level of transparency of a COOP. The project will also build a technological framework that will facilitate access to information, through linked open data (LOD), in a global and granular manner – that is the TI will be available openly not only as a global score but also as several scores per dimension. The project will build a technological environment (Web platform) for final users to be able to view the data in a tailored way, made available to be shared and re-used by third parties.

This paper is organised as follows: the following section presents the concept of transparency in the context of Cooperatives. Section 3 presents the technological paradigm of the project. Section 4 presents the research methodology planned for the project, and gives some insights of the methods and techniques used to develop the activities. Section 5 presents every task of the project in detail. The paper ends with the final considerations and future work.

2. COOPERATIVES AND TRANSPARENCY

Cooperatives (COOP) are an organisational phenomenon based on similar economic and legal regimes in all parts of the world (Dabormida, 2017; Fajardo et al., 2017). They are legally obliged to provide information regarding their constitution, functioning and available economic and social activity (Elorza, 2014). The International Cooperative Alliance (ICA) principles ask for transparency on the COOP's operations since the specificities of its purpose are very clear: to satisfy the needs of the members. COOP should not then pursue profit. Transparency involves collecting information and making it accessible to the COOP's members, to the Government and to the public in general (BCB, 2008; Fariñas & Pacheco, 2019; Meira et al., 2020). The COOP's functioning must be based on trust and in strengthening governance, and must contribute to COOP's sustainable growth (Ruben & Lerman, 2005). COOP need members to trust the management team and the workers (Hu et al., 2017).

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Well-run COOP, with high levels of integrity and transparency, are fundamental to a good performance of the organisation (Kowalczyk-Hoyer & Côté-Freemann, 2013). A good governance can be achieved with good practices to create strong, efficient, and transparent systems (UN Desa, 2016). The obligation of transparency in COOP is transversal to all countries in the world (Cracogna et al., 2013; Fariñas & Pacheco, 2019). Even though COOP's members feel confident about the organisation's performance, they are unsatisfied about COOP public information. When there is an information asymmetry in the COOP in aspects considered critical, the lack of

confidence increases amongst its members. This shows the importance of improving knowledge about COOP and of increasing information dissemination.

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Some projects have already been working on the issue of transparency in COOP: i) PECOL investigated the new trends in the European COOP law. It showed that the Regulation on European COOP has had a very limited success and that the COOP's law in the EU has a framework of non-harmonisation. The deregulation of the legal-cooperative regime, and excessive liberalisation, can irrevocably compromise the COOP's identity. Thus, PECOL's specific objective was to define a set of principles that can be a reference for the legislator when legally regulating COOP. The PECOL project results (see Fajardo et al. (2017)) highlight the need to adequately regulate the transparency obligation PECOL contributed to the modernisation of the COOP model, which implies a legal regime that enhances transparency. PECOL published a report (see Fajardo et al. (2017)) which has already served as reference in legislative reforms in several countries; ii) Transparency is also the subject of the project "International Labour Organisation Research on Addressing Pseudo-Cooperative Practices in Labour Intermediation"; iii) "The Framework Partnership Agreement COOP in Development - People-centred Businesses in Action", aims at identifying the regulation of transparency in different countries of the world.

These three projects highlight the double nature of transparency as a hard and soft law obligation, calling for the creation of metrics that evaluate transparency and for ways of disseminating the information on which this obligation of transparency applies.

The "Theo Frame Accountability" project[1] responds to the challenges faced by Social Economy entities which need to disseminate good practices and their social impact on the community, thus generating greater responsibility/accountability towards its stakeholders. The identification of best practices in terms of transparency was also one of the objectives of the Project "Update of the mapping of social enterprises and their eco-systems in Europe" (see the 2019 Portuguese report - Ferreira (2019)).

These projects show the relevance of transparency in the governance of COOP and the need to define instruments that make transparency visible to all COOP's stakeholders (Aponcio, 2020; Bandeira et al., 2018; Maguregui Urionabarrenechea et al., 2019).

The project that we envisage to develop aims at bringing the issue of transparency as an obligation to the COOP's agenda, and to allow Governments and legislators, and the COOP's community, to have access in a standardised way and in real-time to the COOP's operations at a regional, national, and transnational level, and also by sector, by sector-region, among other possibilities. Although transparency is a legal requirement, the legislator does not define the mechanisms by which this transparency should be measured. To the best of our knowledge there are no

[1] see http://tfa.pt - accessed in June 26, 2020

mechanisms to assess this legal requirement, and in an automatic way. Therefore, the project that we present in this paper may contribute to the improvement of the legislation that frames the COOP sector by providing the technological tools that can measure in real-time the level of transparency of a COOP.

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2.1 Transparency Index

The project aims to develop a **Transparency Index for Cooperatives (TI)**.

An index is a mathematical relationship that combines several dimensions, indicators or measures to form a single number (Greco et al., 2019). TI will be made of a set of indicators that will give not only a global level of transparency of the COOP, but also a level by dimension. This will provide a standard way to compare COOP.

TI will become a useful instrument for more statistical analysis. According to Cabedo et al. (2018, p. 335) "the advantage of establishing an index is that it is standardised, with a previously set structure, and can thus be generalised". TI will be developed to be used by any cooperative in the world. Adding to that, we believe that the framework we aim to develop to obtain a TI of a COOP can be applied to other organisations (either profit or non-profit), with the appropriate adaptations. Thus the results of this project are not just limited to COOP, they rather open ways to other possibilities.

[2] See http://tfa.pt - accessed on June 26, 2020

TI is a figure made of a calculation based on quantitative & qualitative information. The project will define a framework to transform this qualitative information into quantitative so that a calculation is possible.

The information needed is now provided by the COOP but most of it is hidden in reports that might be or not publicly available, or can be published in the Websites of the COOP, but distributed over a series of web pages, making the information difficult to find. There are satellite accounts available in many countries (Ávila et al., 2013; Campos & Ávila, 2012) but the data may be not up-to-date, and not complete.

There are already some indicators of transparency, but they are not suited to COOP:

- Cabedo et al. (2018) developed an index with three dimensions: Technical, Financial and Scope. There is also a Municipal Transparency Index (MTI) in Portugal with seven dimensions: Organizational, social composition, operation of the municipality; Plans and planning; Local taxes, rates, service charges, and regulations; Relationship with citizens as customers; Public procurement; Economic and financial transparency, and; Urban planning and land use management (da Cruz et al., 2016);

- Moreno et al. (2016) developed an index for the organisational and economic transparency of foundations with seven dimensions: economic transparency; statutes; conflict of interest; governance; management; non-managerial staff; and volunteering;

- Dumont (2010) evaluated the quality of NGO websites according to 3 dimensions: usability, content and communication;

- Cooke (1989) developed a calculation scheme to assess the level of disclosure of Swedish companies;

- Carvalho et al. (2010) defined a MTI for Municipalities in Portugal. This index integrates the Total Compliance Index (ICT) and the Partial Compliance Index (ICP). The Compliance Indexes assess the adequacy of Portuguese municipalities' accounts with the requirements of the financial reporting system recommended by the Official Plan of Accounts of Local Authorities;

- Gaio & Mateus (2014) analyses the degree of compliance with the disclosure requirements of the International Accounting Standards of the financial reporting for Portuguese companies listed in the Portuguese stock exchange.

The World Economic Forum produces the Global Competitiveness Index, which includes the pillar “Institutions”, in which, besides several indicators for the quality of the public sector, transparency is enhanced. In private institutions, this pillar includes governance, assessed through the strength of auditing and accounting standards; conflict of interest regulation that measures the protection of shareholders against directors’ misuse of corporate assets for personal gain; and shareholder governance.

This project can make a strong contribution to the enrichment of national satellite accounts. On the other hand, there will be an availability of up-to-date information that can be used by regulators in the COOP sector.

3. THE TECHNOLOGICAL FRAMEWORK

The project we present here aims to develop a technological environment (Web platform) so that final users can view the data about COOP with graphs and maps that they can manipulate and tailor to their own interests. Adding to this user interface, the data will be made available to be shared and re-used by third parties in order to make it reusable and exchangeable.

The technological paradigm of this project is the Semantic Web (W3C, 2012), a paradigm of Linked Open Data (LOD) where machines reason on data and offer new discoveries. This possibility of reasoning on a large scale, with data from different sources but structured in the same way, presents great potential for communities of practice. When data is published through the Semantic Web, it becomes part of a large global database, with all the advantages that this can bring. The data provider is no longer isolated in its information silo, becoming part of the ecosystem of LOD; once the data of the COOP is published as LOD, it can also be linked to related resources that have already been published in the LOD cloud by other entities, enriching the data. This possibility is an enormous advantage over any other technology since there are resources that probably have never been linked ever, or at least not treated by intelligent machines as truly relatable data.

In the future we envisage an eco-system made of interoperable datasets that feed software tools. These possibilities can build a world view of COOP, something that was never done before.

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In the future, we envisage an ecosystem made of interoperable datasets that feed software tools. These possibilities can build a world view of COOP, something that was never done before.

For this information to be publicly available, we aim to create an interoperable framework on the Semantic Web by developing a metadata application profile (MAP) (see Coyle (2017)) so that COOP have a common guide to publish compliant datasets. A MAP is based in a common data model which needs to be developed based on community requirements. This common data model has already begun to be defined in the work made available by (Curado Malta et al., 2019).

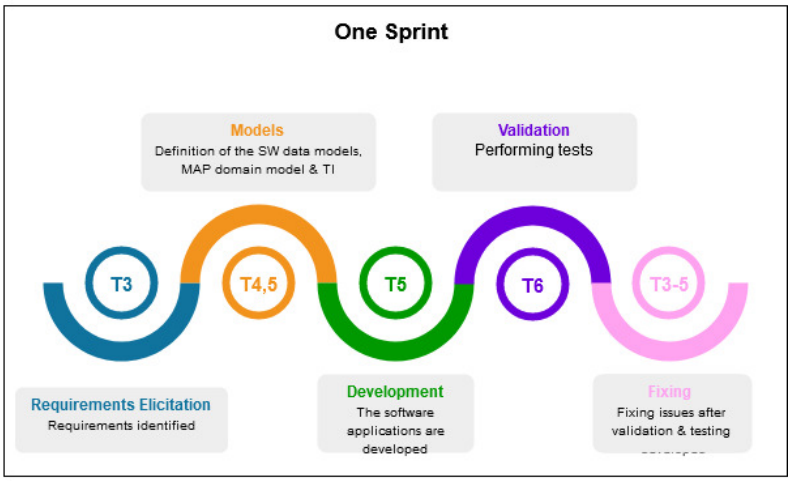
A MAP enhances interoperability between LOD datasets of a community of practice when this community uses the MAP as a data model to publish the data (Nilsson et

al., 2009). Berners-Lee (2009) also states that data structured according to the principles of 5 stars' metadata (also called LOD) becomes open and interoperable.

4. RESEARCH METHODOLOGY

The project uses an agile type of methodology[3]. This means that we will be doing incremental steps (termed sprints), releasing small pieces of software applications to be tested by the end-users. The project will have two types of end-users: the ones that publish compliant datasets (type 1) and the ones that use the Web Portal (type 2). The sprints are organised in phases to be defined at the beginning of the project. Figure1 presents the typical activities within such a sprint, following the traditional cycle of requirements elicitation, models definition, software development, validation testing, and fixing bugs.

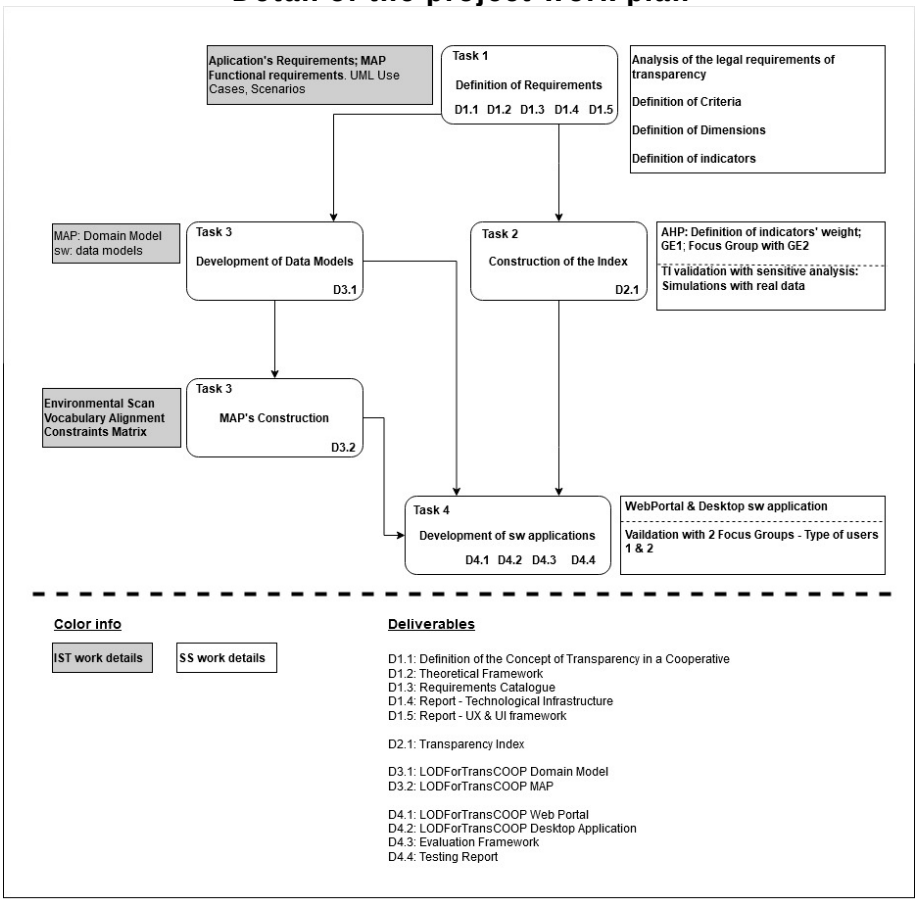
Figure 1.
Activities done in every sprint



The project is transdisciplinary, it covers two main scientific domains: the social sciences (SS) and the information systems and technology (IST) domain. Figure 2 presents the work plan of the project where the IST domain work is noted in white and the SS in grey. The work starts in Task 1 which is shared by the two domains of work, even if they work independently there is the need to work in cooperation since the IST domain needs to understand the context. In the side of the SS domain, Task 1 hosts the activities of definition of the requirements of the TI, which we call the Theoretical Framework (TF).

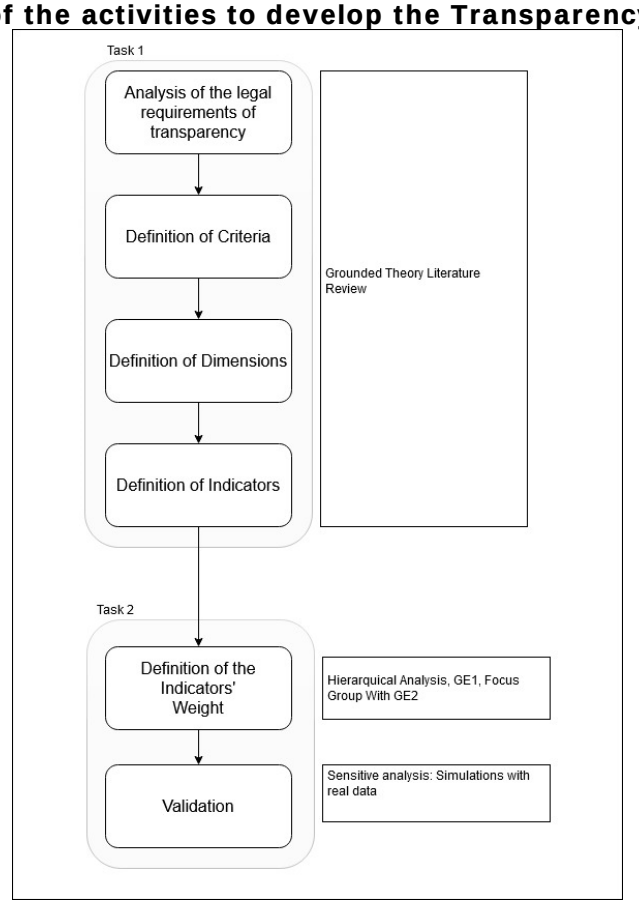
[3] See https://www.scrum.org/resources/blog/so-what-agile-really-about?gclid=Cj0KCQjwo6D4BRDgARIsAA6uN199L7ikr1FegAVryJdRC3ea4GBNECNxRh1Imc4x9wOb8YFT9iaHi0IaAoBHEALw_wcB – accessed July 10, 2020

Figure 2.
Detail of the project work plan



It is actually the definition of a set of indicators organised by dimensions. This is done in successive activities (see Figure 3): the analysis of the legal requirements of transparency, the definition of the criteria, the definition of the dimensions and of the indicators. At the end of this activities Task 1 delivers the report “Definition of the concept of transparency in a Cooperative” and the TF. TF will provide: i) the basis to define the concept of transparency in COOP; ii)

Figure 3.
Detail of the activities to develop the Transparency Index



its multi-dimensions; iii) the criteria to be considered for selecting the indicators that will form the dimensions of transparency and; iv) the criteria for the indicators' underlying variables (Commission & others, 2008).

To do the systematic bibliographic analysis we use the Grounded Theory (Wolfswinkel et al., 2013), which allows us to compare, relate, link, and refine identified themes with each other.

Still on Task 1, but now on the side of the IST activities, we will work on all the activities related to the elicitation of functional & non-functional requirements of the software applications that will be developed and the informational requirements of the MAP. We will use UML & Use-Cases, and the Scenarios techniques. These activities will deliver the “Catalogue of the requirements” of the software applications and MAP, a report with the “Technological infrastructure” needed, and a report with the “User Interface and User Experience” of the software applications.

After Task 1 follows Task 2 and Task 3, where the different domains of work diverge to specific activities. Task 2 starts with the construction of the TI, based on the TF. The method “Analytic Hierarchy Process” (AHP) (see Saaty (2008)) will be used to define the weight of the indicators.

Since transparency is a multifaceted issue that covers several organisational areas of the COOP, TI will be constructed with the contribution of experts in multidisciplinary areas. A group of experts (GE) composed by academic and COOP members, and by members of umbrella organisations of the COOP sector, will be defined at the beginning of the project. This groups have a role in different steps of the construction of the TI. The contribution of the specialists will have different weights according to

the activity they perform. This GE will be divided into two groups, GE1 and GE2, where, in both groups, all different types of expertise will be represented. They will participate in two different moments of the construction of the TI. GE1 will participate on the definition of the weight of the indicators' activity. The group will assign weights to the dimensions and indicators arranged in the TF, generating a TF with assigned weights (WTF). WTF will be submitted to a qualitative analysis with GE2. TI will then be constructed based in this new framework (WTF) according to a mathematical model. TI will be tested using data from a sample of COOP, and since the construction of an index involves subjective choices it will be necessary to perform robustness and sensitivity analysis on assumptions (Commission & others, 2008). Task 2 delivers at the end of the process the Transparent Index (TI).

On Task 3 we start developing the MAP following the method defined by Curado Malta & Baptista (2013), this activity includes: the definition of the domain model, of the environmental scan, the vocabulary alignment, and the constraints matrix. This task also defines the data models for the software applications. Task 3 delivers the Domain Model of the MAP and the MAP.

Finally, all the work done in these 3 tasks leads to Task 4, where everything comes together for the development of the software applications. The TI is implemented informatically, integrated in the user interfaces of the Web Portal, and the MAP will be used as a guide for the publication of LOD datasets related to the COOP activity.

The whole project is done in an agile process, as already mentioned, in order to develop pieces of software that can be tested throughout time.

Finally, the project team will identify a set of COOP of different sectors and with different dimensions so to have real COOP data to validate the TI and to test the software applications. Two focus groups will be conducted for these validations, one with types of users 1 and the other with types of users 2.

Task 4 will deliver a Web Portal with several functionalities related to the TI such as data visualisations and simulations; a desktop software application to create the datasets related to the COOP activities locally and to publish them on the project's server.

5. PROJECT TASKS

The project has 4 technical tasks (see Figure 2). The first one aims at developing the requirements either of the Transparency Index as well as the software applications and data publishing. Task 2 aims at the development of the Transparency Index. Trask 3 the MAP and Task 4 wraps up all the outputs of these 3 tasks and develops the software applications integrating those outputs in a Web Portal and a Desktop application. The next sections describe in detail each one of those activities.

5.1 Task 1 - Definition of Requirements

The goals of this task are i) to develop a Theoretical Framework (TF) to define transparency in COOP as a concept and identify criteria to select the indicators of dimensions, (ii) to design the User Experience & the User Interface of the software applications to fully respond to the identified users' needs and the project scope, iii) to identify the functional requirements of the applications, and the informational requirements of the MAP and iv) to define the technological architecture that will support the project.
A TF is developed to define: the concept of transparency; to provide the basis for the selection of the dimensions through which transparency should be analysed and; to

define criteria to select indicators to measure each dimension (Commission & others, 2008). To reach this goal we need to analyse: the legal COOP regime; the legal requirements for transparency in the COOP; and, other dimensions in which the COOP should make information available compliant with the COOP principles, as well as their corporate social responsibility.

We will perform a Bibliographic Analysis (BA) on Scopus and Web Of Science (using Grounded Theory as methodology - see Wolfswinkel et al. (2013)). The Grounded Theory allows the iteration of research themes. This results in the definition of a set of dimensions and indicators that we call the Theoretical Framework (TF). It will be the basis for the definition of the weights in Task 2.

Two software applications will be developed, the Web Portal; and the Desktop software application. This task will identify requirements, which can be functional (services that applications should provide, how applications should react to particular inputs, and how they should behave in particular situations), non-functional (constraints on the services/functions offered by applications), or informational (to publish datasets - MAP). State of the art techniques of software engineering (e.g. Use-cases, UML) will be applied to identify the requirements which will serve as the basis for the specification of the data models (Task 3). This activity will result in a catalogue, where for each requirement there is the name, description, priority, non-functional considerations, benefits, related documents, etc. It will define the User Experience (Ux) & User Interface (UI) of the software applications. For that we will perform interviews to end users (both types identified) and a survey within the community of COOP. These results will be used to develop 4-6 personas profiles and related user stories and scenarios, that will describe what these users expect to do, and will be used to develop the flow of the software applications. The requirements' elicitation will be conducted in collaboration with UX & UI activities, in order to identify common use-cases.

This task will also identify the needs of hardware, software, network resources & services of the server and of the software to be developed.

5.2 Task 2 – Construction of Index

The goal of this task is to define the Transparency Index for COOP.

This task performs the Analytic Hierarchy Process (AHP) which aims to define the weight of each dimension and indicators. The 1st step of the process is the formation of the group of experts (GE1 - group 1). Each member of GE1 will evaluate, recursively, the dimensions according to its judgment about the relative meaning and importance of each dimension. HP is based on human judgments and not only on the underlying information, that is one of the essences of the methodology (R. W. Saaty, 1987). AHP converts these assessments into numerical values that can be processed and compared. A numerical weight or priority will be obtained for each dimension, allowing these dimensions to be compared with each other in a rational and consistent manner. The same process is then repeated for the group of indicators within each dimension. These dimensions and indicators will be organised according to one hierarchy in a Weighted Theoretical Framework (WTF). A more precise description of the method, as well as the justification for its mathematical consistency, can be seen in T. L. Saaty (2008).

The indicators of each dimension have to be measured through variables. The second step of this task will be to select the measure variables of transparency. These variables should be selected based on relevance for measurement of transparency, measurability, accessibility and they must be common to different types of COOP and

countries (Commission & others, 2008). If the selected variables have different measurement units, they will be normalised (using methods such as standardisation - or z-scores, Min-Max) or transform qualitative indicators into quantitative indicators.

On the 3rd step a Focus Group with GE2 will be implemented to validate the WTF. The Focus Group will discuss the correlation and weight issues among indicators, according to the sensibility, knowledge and experience of each member. If the problems that arise are relevant to the issue of transparency, they will be corrected, otherwise they will not be addressed.

Once the weights have been finally assigned, the 4th step will be to compile the indicators into dimensions. Each dimension corresponds to a "composite indicator". Dimensions should measure multidimensional concepts which cannot be captured by a single indicator. The dimensions will be compiled generating a single index, the Transparency Index (TI). The compilation of indicators and dimensions will follow mathematical modelling based on an aggregation method, considering the established weights.

An important aspect of AHP is the possibility to measure inconsistency in judgments and eventually correct it. Since the quality of the model depends on the solidity of the assumptions, it will be necessary to perform robustness and sensibility analysis, on including/excluding variables, on weight schemes and consistency(T. L. Saaty, 2008). After finishing the construction of the index, it will be tested on a sample of COOP selected from different sectors, sizes and regions.

5.3 Task 3 - Development of the data models

This Task aims to define the data models that will serve the software applications; and define the Metadata Application Profile (MAP).

The software applications will need two sets of data models (that overlap in some dimensions): the applications' data models and the MAP data model (also called domain model). The applications' data models cover all the data needed to support the administration and use of the software applications. This Task will define and analyse the data needed to support all the application' requirements identified in Task 2. Each application will have its own data model, though with shared components.

The development of the MAP will follow the Me4MAP method (see Curado Malta & Baptista (2013)). Me4MAP defines a set of activities and the order of each one in the process. The first activity is the identification of the informational requirements which are done in Task 2. The next activity is the definition of a domain model that represents these informational requirements identified, as well as the metadata information and provenance. This domain model will be the starting point for the rest of the MAP development. The next activity is the definition of the "Environmental scan" which is the establishment of a state-of-the-art regarding RDF vocabularies and vocabulary and syntax encoding schemes (VES or SES, respectively) that can serve the domain model developed, so that the MAP will enhance interoperability not only among the community of practice but also with other communities. The Environmental Scan will feed the "Vocabulary Alignment", a document that identifies for each property in the domain model, candidate terms from the RDF vocabularies present in the Environmental Scan, that express the semantic need of the term in question. With all the possibilities established, the work follows for the definition to the "Constraints matrix", a document that elects from the Vocabulary alignment the best term for each property in the domain model and the constraints for the term (cardinality, SES or VES, among others). For the terms that do not have candidates

on the Vocabulary Alignment, they will be incorporated in a new RDF vocabulary that needs to be developed and published. The same applies to the constraints, we might need to develop new VES or SES to respond to the needs of the constraint matrix.

This task also defines a workflow for the maintenance of the MAP so that the community can continue to discuss the model and obtain answers after the project is completed. For that we will create a GitHub account so the community can use the "pull request" and "issues" tools, among other tools provided by GitHub.

5.4 Task 4 - Development of Software Applications

This task has as goals to set up the LOD infrastructure of the project and to develop the software applications.

The technological infrastructure will be put in place, including a SPARQL endpoint and API so that 3rd party users can use the data freely.

The software applications will be developed according to the functionalities defined in Task 1. We will develop:

- A Web Portal that on the Frontend (for the types of user 1):

i. provides views of the project data (available on the server and on the LOD cloud);
ii. allows the download of datasets in different formats to work locally on the data;
iii. has a tool that returns a transparency global score as well as by dimension, of a selected dataset.

- On the Backend (for the types of user 2) allows users to:

i. create an account and load and manage compliant datasets;
ii. explore a dashboard for simulations, where they can understand how to improve the transparency score of their own datasets.

- A desktop software application that will:

i. provide a way for users to load the information needed to obtain the transparency score;
ii. save data locally or publish data in the project server to be available on the LOD cloud. The MAP will provide the guidance for the data publishing on the implementation of the LOD database that serves the interactions and the information visualisation framework.

The visualisations of the data will provide ways to analyse not only the global level of transparency of each cooperative but also to analyse by dimension, indicator, variable, branch of activity, size, or region. It will also be possible to develop cluster analysis to identify homogeneous groups of COOP in terms of transparency.
The validation of the software will be done with the following steps:

1. Design a framework for the tests.

- The tests have 3 aims: 1) Functional Testing: concerned with the functional requirements of the systems and covers how well the system executes its functions: 2) Non-Functional Testing: concerned on how well the software products behave in terms of e.g. performance, interoperability, scalability, stress, reliability and dependability, among others: 3) User experience/User Testing: concerned with understanding if the design of the platform responds to user needs and allows users to accomplish their tasks. User tests will be performed involving groups of at least 5 users (corresponding to the defined personas).

- Definition of the i) Questionnaire to apply during the Focus Groups testing, and ii) the benchmarks to apply, that is to identify the testing environment, identify performance metrics, plan and design the tests.

2. Run the tests:

- For the functional tests: we implement the test design, run the test, collect and treat the results, analyse and report.

- For the non-functional tests: we implement the test design, execute the tests, treat the results, analyse and report.

3. Reporting: a final report is delivered to the team that implements the work defined in Tasks 3, 4 & 5 so that they improve the software applications and models according to the results of the tests. Each cycle of tests has 1 report with the functional, non-functional and user experience tests.

These tasks deliver the Web Portal, the Desktop Application, and an Evaluation & Testing Report.

4. Final Considerations and Future Work

Cooperatives benefit from positive discrimination, and therefore there is a legal need for transparency. In the absence of adequate instruments to measure these entities' transparency, this paper presents a new project that aims to develop a proper transparency index for Cooperatives.

The project aims to provide a data model so that structured and interoperable data on the activities of Cooperatives can be published. The final idea is that these data are published as linked open data on the Semantic Web so that intelligent agents can use it in other software applications. Open data enhances creativity, so the possibilities are immeasurable. In addition to this, linked open data will allow any policymaker entity such as governments or top organisations to have interoperable data about the activities of the Cooperatives so that they can create new policies based on facts.

The transparency index that we will be developed is based on the double dimension of cooperatives' object (economic and social). It may be used either by other entities of the social economy or by capitalist entities that increasingly intend, under the corporate social responsibility, to disclose not only the economic dimension of their activity but also the social and environmental dimensions of sustainability.

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